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OVARIAN TUMORS IN CHILDHOOD WITH REPORT OF FIVE CASES*

BY THOMAS H. LANMAN, M.D., F.A.C.S †

IN presenting these five cases of ovarian tumor, I shall limit myself to the clinical and surgical aspects of such tumors as are seen in children, and discuss some of the cases we have had at this hospital from the points of view of incidence and age; clinical history, especially preoperative symptoms and their duration; physical examination; differential diagnosis; and operative findings. It is not the purpose of this paper to present the pathological aspects of tumors of the ovary in detail, nor to attempt to classify them, except in so far as it may help to give a reasonably accurate prognosis.

In the past ten years, in 12,260 admissions to the surgical service of the Children's Hospital, there were found only five cases of ovarian tumor. This gives some idea of the rarity of tumor of the ovary before twelve years of age, but shows that the condition exists. In discussing the clinical histories, it will appear that tumor of the ovary must occasionally be considered in the differential diagnosis of abdominal conditions in children. Our youngest case was five years, the oldest eleven years.

Gardner[1], in Lewis's Practice of Surgery, reviews the first 29,000 cases on file at the Johns Hopkins Gynecologic Pathological Laboratory from the point of view of age incidence. There were six hundred and nine ovarian tumors in this series, and the youngest was six years. There were thirty-four cases, or 5.6%, occurring between the ages of six and twenty years. Gardner notes that about the same per cent., 7%, occurred after sixty years of age, and remarks that ovarian tumors are as common before twenty as after sixty years of age, but does not give figures showing how many of the thirty-four cases occurring before twenty were in patients younger than twelve.

Steffen[2], as quoted by Schultze[3] in Abt's Pediatrics, tabulated 870 tumors occurring in childhood and found only nine or 1.1% were of the ovary. In this group of Steffen's 28% were of the kidney; brain, 10%; eyes and orbit, 11%; bone, 9%; skin, 6.7%; stomach and liver, 5.7%; other organs, 3% or less. This shows the relative infrequency of tumors of the ovary in childhood as compared with other organs.

In the same chapter Schultze[3] gives a table of, "Organ distribution of tumors from census statistics of the registration states of the United States for the year 1914". Here we find that of 47,896 reported tumors, 413, or 1%, occurred in patients below fifteen years of age. Of these 413 cases, only four, or 0.98%, were of the ovary, which corresponds closely to Steffen's figure, 1.1%, quoted above. In other words, about 1% of all tumors occur in patients of early years, and of this 1%, about 1% are tumors of the ovary.

Weil[5], in 1904, reported sixty cases of ovarian tumor occurring under ten years of age, of which twenty-four were under five years. Downes,[6] in 1921, reported the successful removal of a non-malignant cyst of the ovary in a child of seventeen months. The clinical history of this case would suggest that the growth had been present for some months, possibly since birth. Downes collected twenty-one additional cases of ovarian tumor below the age of ten since Weil's report.

Ewing[7], in discussing ovarian tumors, says that "all ages are susceptible, from birth to senility, but twenty-five to thirty-five, the period of sexual activity, is the most common". He cites a case of Doran[8] of a fetal cystadenoma and sarcoma of the ovary, also a case reported by Lönnberg[9] of a fetal bilateral sarcoma of the ovary. He calls attention to an article by Pick[10], who emphasizes the relative frequency of ovarian tumors in pseudo-hermaphrodites. Ewing further states that the predominance of cysts, dermoids, sarcoma, and of malignant tumors in early life is notable.

Meigs[11], in 1922, in reporting two unusual cases of ovarian tumors, says that there are two main types of sarcoma of the ovary. One occurs in extreme youth, the other much later in life.

Polak[14], in discussing embryomata, says: "Dermoids of the ovary may develop in intrauterine life or at any age. They are the most common variety of ovarian tumor found prior to puberty and they are especially prone to torsion of the pedicle". (See Case 4 in our series.)

The following five case histories, with opera-

*From the Surgical and Pathological services of the Children's Hospital, Boston.

Read at the Cancer program held in Boston April 23, 1929, under the auspices of the Massachusetts Medical Society, the Massachusetts Department of Public Health, and the American Society for the Control of Cancer.

†For record and address of author see "This Week's Issue," page 597.

tive notes and pathological findings, are reported.

CASE 1. O. T., No. A26948, aged eleven years, entered the hospital in May, 1920. The family and past history were unimportant.

For the past five weeks the child had had abdominal pain associated with increasing size of the abdomen. The pains were cramplike, began immediately after eating, lasted for about fifteen minutes, and did not recur until the patient ate again. No nausea or vomiting; bowels regular; no urinary symptoms. *Physical examination:*—There is a hard, smooth, symmetrical tumor, fairly easily movable, occupying most of the abdomen. No fluid wave; no tenderness. Evident loss of weight.

Laboratory Data: R. B. C. 4,392,000. W. B. C. 34,200. Hb. 45%. Differential Count Normal.

Operation May 21, 1920:—

Solid tumor, originating in left ovary and broad ligament, extending from pelvis to liver, removed and abdomen closed. Uneventful convalescence. Discharged on eleventh day. Later notes on Outpatient record.

Pathological report: S-20-94.

Gross: A large lobulated tumor, weighing 1600 grams. It measures 14x12x10 cm. and seems to be cystic. Section proves that there are cysts beneath the capsule, which contain mucoid, serous, or bloody fluid, according to their location. The tumor is separated by these cysts, or pseudo-cysts from the capsule, which is well marked. It is a structure made up of fibrous bands, glandular complexes like cross sections of appendix and bits of cartilage, grayish to reddish, or brownish gray in general color.

Rush microscopic: Teratoma, with rather poor differentiation.

Microscopic: The tumor is made up of all sorts of tissue. There are ovarian follicular cysts, bits of cartilage, enamel organs, strands of muscle, epithelial tubes and tubules. There are sympathetic ganglia and masses of undifferentiated tissue, the latter rapidly growing and quasi-malignant in appearance. These are not frequent.

Diagnosis: Teratoma of Ovary.

Later Notes:

June 19, 1920—Wound clean and solid. General condition good.

September 25, 1920—Pains in both legs—left more than right. Loss of appetite. Pale; loss of weight. Physical examination—Small hard mass in left lower quadrant. Evident recurrence. Referred to Huntington Hospital for question of treatment with x-ray or radium, but patient evidently did not report. Died soon after. Lived five months after operation.

CASE 2. L. A., No. 25589, aged ten years, entered the hospital April, 1920. The family and past history were unimportant.

Five months ago the patient had an attack of vomiting, which lasted for a period of nearly six weeks, occurring "many times a day"; no marked abdominal pain, but she lost weight rapidly, "sweated profusely", and had occasional chills, though no cough or fever. At one time she had a vague story of difficulty in urination and defecation, but this lasted only a day or two. She is said to have passed some round worms by rectum at the time of onset. The vomiting became gradually less and there was some apparent improvement in appetite. Bowels regular but some frequency of urination noted for a few days before entrance, also increasing size of abdomen. Between the cessation of vomiting, three and one-half months ago, and a few days before entrance there were no symptoms of any note observed by the parents. *Physical examination*—Poorly developed and nourished child. Abdomen: marked distention and prominence of superficial veins. No spasm, tenderness or rigidity anywhere. A mass the size of a cocoanut in the left lower quadrant, extending from the pubis to within one inch of the costal margin and one inch to the right of the umbilicus. This mass did not move on respiration but was freely movable from side to side, and up and down on palpation. There was some shifting dullness in both flanks. The liver was enlarged. The spleen and kidneys were not felt.

Laboratory Data: R. B. C. 1,295,000. W. B. C. 12,000. Hb. 55%. Platelets normal. Normal differential count.

Operation: Inoperable neoplasm found, with large amount of clear, straw-colored fluid in the abdomen. Omentum filled with small areas of new growth, like tubercles; abdominal and retroperitoneal glands everywhere enlarged. Uterus and adnexa involved. Could not be sure of the origin of the neoplasm; specimen taken for examination. Child made an uneventful recovery and was sent home in nine days.

Pathological report: No. S-20-63.

Gross: A mass of tissue 2.5x15x0.6 cm. with scattered hemorrhagic areas.

Microscopic: A malignant tumor made up of small, round cells with large vesicular nuclei and little or no cytoplasm. They are in no definite arrangement and show numerous mitoses. The fatty tissue has been infiltrated by the tumor and some of it shows chronic inflammation.

Diagnosis: Solid carcinoma of ovary.

Only a small piece of this growth was removed. At operation it suggested "round cell sarcoma". It is interesting to speculate what relation the story of vomiting five months before had to do with the abdominal condition found at operation, and whether exploratory operation would have been justified then and, if done, whether it would have altered the course of the disease.

April, 1929. Letter from family reports that the child lived about one month, gradually going down hill.

CASE 3. V. B., No. A99802, aged six and a half years, entered the hospital November 26, 1926. The family and past history were unimportant.

One year ago, there was a severe attack of pain in the abdomen associated with some urinary incontinence. A local physician diagnosed "pus in the kidney and inflammation of the bladder". The onset was sudden, the pain lasting one to two minutes and recurring about every hour for nearly twenty-four hours. She vomited with the pain. The urine was cloudy. A second attack, more severe than the first, occurred three months ago, and two weeks ago a third attack, even more severe. She was referred to the hospital.

X-ray Examination, November 26, 1929. "Large irregular shadow in bladder region one centimeter in diameter. May be stone in bladder".

Physical examination normal.

Admitting diagnosis: (?) Vesical Calculus. (See plate No. 1.)

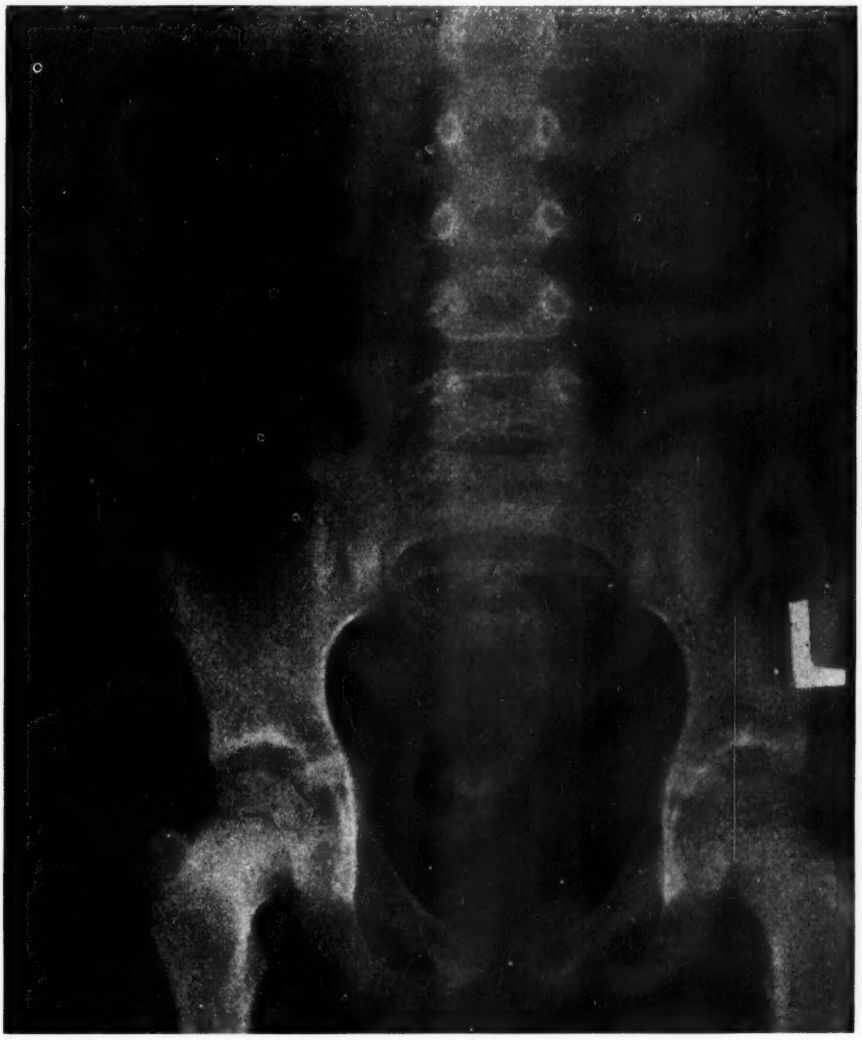
Laboratory Data: Urine contains a few w. b. c. On one examination, urine culture negative. Tuberculin reaction negative.

Steroscopic films, December 3, 1926, show the shadow previously reported at the level of the lower margin of the sacro iliac joint, slightly to the right of the mid-line and anterior to the sacrum about one inch. *Fluoroscopic examination* shows the shadow to remain in the same position, not moving with change of posture. Impression is that it is not in the bladder.

Cystoscopic examination shows the bladder to be normal; no stone seen.

X-rays after cystoscopy. December 6, 1926. Pyelogram shows both kidneys normal and both ureteral catheters in normal course. The shadow is about three centimeters medial to the right ureter. (See plate No. 2.)

Bladder after air injection shows shadow (in A. P. and lateral views) to be posterior and above bladder. (See plate No. 3.)



CASE 3, PLATE NO. I. X-ray taken on admission showing irregular shadow in bladder area.

Impression: Probably calcified mesenteric gland.

Operation: December 11, 1926. Showed cystic enlargement of left ovary. Ovary removed, abdomen closed. Uneventful convalescence. (See plates No. 4 and No. 5.)

Pathological report: S-26-268.

Gross: Specimen is an oval, cystic mass 6½x5½x4 cm. Externally it is yellowish-gray in color with dilated vessels coursing over the surface. The wall appears thin throughout about two-thirds of the cyst, and this portion is translucent. The remaining part has a thickened wall, making it feel quite firm. Here, also, is felt a small stone-like mass within the thickened portion. Along one edge there is an elongated, slender, reddish soft tube covered with serosa. This tube is adherent to the mass. One end is blind, the other end, where the tube has been cut, is open. After hardening in Kaiserling's solution for several hours, the mass was then cut open and contained a clear, yellowish fluid. The walls are smooth and shiny throughout. The part of the cyst which is thickened seems to be separated from the remaining cavity by a serous coating backed up by fibrous tissue. In its central portion, this thickened part is 2 cm. through, and gradually tapers off to the periphery. Here it is thin and merges into the wall of the cyst proper. Within this thickened wall, there is an outer layer of fatty-like tissue with a great many hairs. In the center there is a hard fibrous area intermingled with yellowish, fat-like tissue and from the central part of this fibrous area and projecting into the lumen of the cavity is another small globular cyst measuring 3x2 cm. This cyst has half of its wall thin and serous in character; the other half portion is thickened and much firmer. It contains a viscid, whitish, mucoid material which clings together and comes out whole. In the attachment of the larger cavity, there are seen 2 or 3 little depressions resembling out-pocketings in its lining, and here, in its attachment, is felt amongst the fibrous tissue, a very hard, calcified-like portion which measures about 5x3 mm. Fixed by Kaiserling's solution.

Microscopic: Three sections which together show

a widely myxomatous tissue which has a loose, fibrous stroma. There are present mucous and sweat glands, cartilage, hair shafts, epithelium, closely resembling epidermis, smooth muscle, endothelial lined spaces, and a cyst-like cavity lined with ependymal cells, which is folded up to resemble choroid plexus of the ventricles. Another cavity is lined with simple cuboidal epithelium, built upon a villous-like structure, and resembling the mucosa of the Fallopian tube. An incompletely formed lymph gland is present in one slide; it is close to a piece of cartilage which is almost surrounded by bronchial glands, and

vomiting on the morning of the day of admission. The pain was severe and doubled her up; it lasted about one minute at a time and was relieved by sitting up. No urinary or bowel symptoms. *Physical examination:* Well developed and nourished girl of eleven years. Temperature 99. Not sick. There is a circular, smooth mass in the center of the abdomen, freely movable in all directions, not tender, dull on percussion, and about six inches in diameter.

Laboratory Data: Negative stool and urine. Von Pirquet test negative for tuberculosis.

CASE 3. PLATE NO. II. X-ray showing shadow previously seen. Is not in the course of ureters.

covered on one side by ciliated epithelium as seen in the trachea. There are many blood vessels throughout, and most of these are congested.

Diagnosis: Teratoma of Ovary.

Later Note:

Patient reports in April 1929, two and one-half years later. Wound clean and solid,—no symptoms attributable to condition found at operation. Abdomen normal—no masses.

CASE 4. M. F., No. 9937, aged eleven years, entered the Hospital February 4, 1929. The family and past history were unimportant.

Her complaint was of abdominal pain of sudden onset, of twenty-four hours' duration, followed by

Operation: Large right ovarian cyst, with pedicle twisted one and one-half times, causing congestion. Removed with right tube and ovary. Numerous caseous tubercular glands at the ileo-cecal angle. Appendix removed. Uneventful recovery. Discharged home in care of local doctor on twelfth day. To have sunlight and general treatment directed towards mesenteric adenitis.

Pathological report: S-29-20.

Gross: Specimen consists of a large, cyst-like mass measuring 9x10½x12 centimeters. It is roughly egg shaped and a mottled purplish red color. Its outer surface is smooth and to it is attached a fimbriated end of the Fallopian tube, which is dark red in color. There is a short pedicle near the tube

CASE 3, PLATE NO. III. X-ray showing bladder injected with air and the shadow to be above the bladder.

CASE 3, PLATE NO. IV. Photo of Ovarian tumor removed.

about 1½ centimeters in diameter, and similar in color. The walls do not seem thick and the contents of the specimen are apparently fluid, with which it is moderately distended. In the walls themselves are a few small, round areas, somewhat firmer than the rest, which seem to contain blood clots. The specimen is opened after thorough fixation, and found to contain 480 c.c. of clear, deep yellow fluid. The internal surface is smooth and glistening.

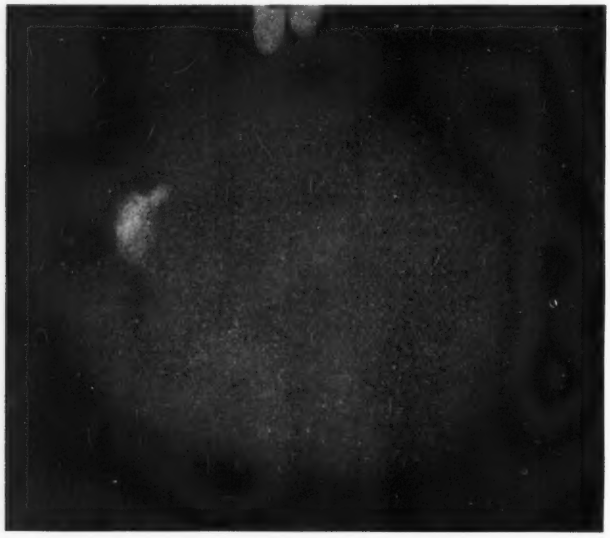
The walls of the tumor consist of two layers separated by areas of hemorrhage in the blood clot, evidently caused by a twisting of the pedicle. In the region of the pedicle beneath the walls, there is a collection of black hair and a yellowish, creamy material, which is not tuberculous in character, but seems to be sebaceous. Collections of this sebaceous material radiate out from the region of the pedicle beneath the walls but are not apparent on that half of the cyst opposite the pedicle.

Impression: Dermoid cyst.

Microscopic: Section is taken across the region of the pedicle for microscopic study. That part of the section which corresponded to the internal surface of the specimen shows a stratified squamous epithelium which resembles the epidermis of the skin. In certain areas, it is covered by a stratum corneum. It dips down into the tissue beneath, in numerous small papillary projections, and several small pits are seen on its surface which appear to be the places of exit of hair follicles. Below this epithelium is a layer of loose connective tissue, which contains numerous hair follicles with sebaceous glands. The hair follicles are quite normal in appearance, contain shafts of broken off hairs and small bundles of smooth muscle are seen in their vicinity, which apparently find attachment near the base of the follicle. The sebaceous glands surrounding them are composed of polygonal cells, having the usual reticulated structure. Beneath this connective tissue layer is a layer of fat cells with connective tissue fibers running through it, in general, parallel to the stratified epithelium described above. This layer contains some of the hair follicles and glandular structures which resemble sweat glands. They are composed of acini of cuboidal or low columnar cells with round, centrally placed nuclei. The lumina contain fixed serous material. At the base of this layer are a few fibers of striated muscle, which, however, have no definite arrangement. There is a rather dense layer of connective tissue which limits the section on the side opposite to the striated epithelium. The former corresponded to the external surface of the cyst. The tissue is well vascularized and there are numerous small areas of hemorrhage into and about the glandular structures and the hair follicles. The most extensive hemorrhage, however, is noted in the outer fibrous layer.

Mitotic figures are not noted and there is no evidence of a proliferative activity of either the epithelial or fibrous tissue elements. No ovarian tissue is seen in the specimen. Histologically, it presents essentially the picture of a dermoid cyst, composed of stratified, squamous epithelium, hair follicles and sebaceous and sweat glands. giving no evidence of malignant changes.

Diagnosis: Dermatocystoma (dermoid cyst) of the ovary.



CASE 3, PLATE NO. V. X-ray film of tumor showing the calcified area described in the pathological report, and is the calcified area that showed in the previous plates.

Later Note:

Two months later patient appears perfectly well. Wound clean and solid.

CASE 5. H. P., No. A7594, aged five years, entered the hospital June 1918. The family and past history were unimportant.

For the past month the mother had noticed that the girl's clothing was becoming tight and that for the past week the abdomen was hard and tense. The day before entrance there had been some pain in the right lower quadrant, but no other symptoms were noticed. Physical examination showed a large cystic mass extending from the left upper quadrant to the right lower quadrant, which did not move with respiration. Pubic hair present.

Operation: Large mass arising from left ovary removed. Good operative recovery; the patient, however, went down hill and died within two months.

Pathological report: S-18-83.

The tumor is composed of a variety of combinations of epithelium and stroma, the latter varying from compact fibrous tissue with an abundance of collagen to a very cellular mesenchyma-like tissue in which can be seen the transformation into mesothelial gland-like structures. Where the stroma is densest, the epithelium is mostly in glandular arrangement, but here and there is found in fairly solid cords. In one block of tissue sectioned, the structure is almost identical with that of the papillary adenocarcinoma of the adult ovary, with large epithelial cells often containing colloid secretion lobules, while the cavities of the growth contain a

pseudomucinous material. Elsewhere the gland formation is not striking and does not particularly suggest ovarian origin. The cells are smaller, the stroma is denser. Here the epithelial cells are cuboidal to low columnar and their inner surface shows a distinct cuticular border, rarely ciliated. The most interesting parts of the tumor are those portions where the appearance suggests the formation of small mesothelial lined cavities rising in a very cellular mesenchyma. These are somewhat comparable to those found in an embryoma of the kidney. Also the picture might be interpreted as reproducing the sequences in the development of the ovary with primitive graafian follicle formation. This tumor is a very good example of the difficulties of applying ordinary nomenclature to tumors of early life. Without doubt it is a malignant tumor because of the many mitotic figures and abundance of undifferentiated elements. It might well be called an adenocarcinoma, although it undoubtedly represents a rapidly growing tumor with numerous potentialities in the way of differentiation. The term "malignant teratoma" is the most noncommittal term applicable.

Diagnosis: Adenocarcinoma (malignant teratoma) of ovary.

In these five cases reported there has been considerable difference of opinion as to the classification of the tumors, but such final opinion as one can give in these cases is that two of them, 1 and 3, should be called teratoma; two cases, 2 and 5, carcinoma, and one case, 4, dermoid cyst.

In both cases classified as carcinoma the patient died within a few weeks or months after operation. One of these was inoperable at the time of exploration. Of the teratomata, in one case, 3, the patient is alive and well two and a half years after operation and should have a good prognosis; one died five months after operation with evident recurrence. The patient with dermoid cyst is well; it is only a few months since operation, but the outlook is good.

Bland-Sutton[4], in his "Tumors Innocent and Malignant" says that "no one has yet succeeded in framing a satisfactory classification".

In reading the literature on tumors of the ovary, this statement of Bland-Sutton's seems also to be the opinion of the pathologist. However, there are a number of points that seem well established from the pathologic side, and are more important from the clinical and surgical side.

Solid growths of the ovary, especially carcinoma and sarcoma, are usually rapidly malignant; in case 2, a carcinoma, the patient had abdominal symptoms for five months, but the usual clinical history is shorter and the chance of successful surgical removal before metastases occur is slight. In case 1, a teratoma, there were symptoms for only four weeks and, although the entire mass seemed to have been removed, four months later there was a palpable mass, evidently a recurrence, to be felt in the abdomen and the patient died soon after. There was some difference of opinion as to whether this tumor should be classified as a teratoma with malignant degeneration, or as a sarcoma.

Ewing[7], in discussing sarcoma of the ovary, says—"The round cell sarcoma of the ovary is an ill defined and rare form of malignant tumor which occurs chiefly in young subjects and proves rapidly fatal"; and adds that "it seems probable that some of the tumors with indifferent round cells are to be interpreted as one sided developments of teratoma".

Kaufmann[15], in discussing sarcoma, says, "Sarcoma of the ovary occurs mostly in early adult life, but has also been observed in children. Round cell sarcomas are rapidly growing, are rare and very malignant; recently the author saw two in children of seven and ten years, respectively".

Wolfson[12], as quoted by Meigs[11], states that "in child life before the age of five, 50% of all sarcomas of the ovary occur". Kelly-Noble[13], quoted also by Meigs, says that 50% of ovarian tumors before the age of five are sarcomas.

Ewing[7], in speaking of carcinoma, says, "Until a more thorough understanding of the many forms of ovarian carcinoma is attained, no classification can hope to escape revision".

Kaufmann[15] states that carcinomata "are characterized histologically by an extraordinarily variable structure, especially those that arise in children; the prognosis is very grave. They may occur before puberty, indeed even in small children".

Clinically, sarcoma and carcinoma of the ovary in childhood are rapidly malignant and although surgery offers the only hope and should not be withheld, the prognosis is very grave. Case 5, classified as adenocarcinoma, might be classified as malignant teratoma or embryoma.

While there is still no universally accepted classification of the other types, from a strictly clinical point of view, there are several points that should be emphasized in a paper of this sort.

Kaufmann[15], in discussing dermoid cysts and solid teratomas of the ovary says,—"Dermoid cysts and teratomas are particularly hard to differentiate when they occur in the ovaries. According to Wilms, we speak of dermoid cysts — cystic teratomas—embryomas—rudimentary parasites, when the structure is made up of fully differentiated tissues, organs, and at the same time the rudiments of a foetus; solid teratomas, embryoid tumors, when the embryonal tissue retains its fetal character, i.e., after reaching a certain degree of differentiation, it grows further in a lawless manner, without boundary and without giving rise to completed organs".

Polak[14] says that both solid cysts and cystic growths of the ovary may be either benign or malignant. Gardner[1] says that one-half of ovarian tumors are of but minor clinical significance since they belong to the group of simple retention cysts. But "of the true ovarian neoplasms, 1/5 are definitely malignant, 1/8 are semi-malignant and the remaining 2/3 are quite

benign although any and all of them may assume malignant characteristics at any time".

In childhood it is probable that careful microscopic examination of what appear to be only simple cysts will reveal a larger number of cysts that belong in the general classification of so-called embryomata and therefore are to be considered at least as potentially malignant. This was noted by Downes[6], who classified twenty-six cases since Weil's[5] report as 62% malignant or potentially so, and 34% benign; as contrasted with Weil's classification of 33% malignant and 66% benign. Downes attributed this difference to a more careful pathological examination. Grossly, case 4 in our series was a benign cyst of the ovary, but microscopically was a definite dermoid.

Aside from the carcinomata and sarcomata, it seems probable that a larger per cent. of tumors of the ovary in childhood should be classified as among the embryomata. Again quoting from Ewing, we find his statement: "Studies in histogenesis indicate that developmental anomalies are essential conditions in the growth of the great majority of ovarian tumors".

Wolbach[16], in a personal communication, says he would advise that the term "embryoma" be dropped entirely, "although it is perhaps as good a term as any to express the tumor in case five." He is inclined to believe that all these tumors of the ovary have a common origin, the more slowly growing ones becoming dermoid cysts and teratomas, the more rapidly growing ones the so-called embryomas, sarcomas, carcinomas.

Whatever the classification of these tumors, there is no difference of opinion as to treatment. Radical surgical removal is indicated, except, perhaps, in those cases of rapidly growing tumors where abdominal metastases are already present at time of operation. In such cases neither surgery, radium nor the x-ray seem to be of any avail. Often, especially in the solid tumors, it may be difficult to make a diagnosis until too late, because the cases are not seen until the growth has progressed too far; but by education of the lay public some, at least, of these cases may possibly reach the surgeon in time for successful radical removal.

Ovarian tumors encountered at laparotomy for acute abdominal disease, such as cyst with a twisted pedicle, should, of course, receive the accepted treatment of radical removal, supplemented by careful pathologic examination. In obscure abdominal conditions ovarian tumors must be considered occasionally, and if clinical findings justify it, exploration should be performed with radical removal of the tumor, if possible.

There is still prevalent the feeling that infants and young children do not stand surgical operations well, especially major abdominal procedures. Such is not the case. With proper preoperative care and with as rapid an operation as is consistent with good surgical technique, these young patients do surprisingly well. And the chance of complete cure, such as we can reasonably offer for cases 3 and 4, should not be withheld on account of age.

In conclusion—

1. Tumor of the ovary in childhood is rare but must be considered in differential diagnosis.

2. A large percentage (in our series 60%) of ovarian tumors in early life are rapidly malignant, and even with early diagnosis the prognosis is grave.

3. Surgery is as yet the only method of cure. In our opinion radium and x-ray have not yet proved to be of value in ovarian tumors of childhood.

4. The apparently benign tumors of the ovary in childhood should be removed as soon as diagnosis is established, as the so-called benign tumor may become malignant at any time.

5. Cases of obscure abdominal conditions, where tumor is suspected, always justify an exploration.

6. Cases of rapidly growing malignant tumors can usually be diagnosed before operation by the clinical picture of rapid loss of weight and other signs of cachexia. But even in these cases exploration should be offered as the one method of definitely establishing the diagnosis and possibly offering some chance of removal of the growth.

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EXPERIENCES WITH SPINAL ANESTHESIA IN GENITO-URINARY SURGERY*

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THE recent increase of interest in spinal anesthesia has led the authors to reconsider its suitability for all of the various operations upon the genito-urinary tract. No branch of surgery has more frequent need to escape the disadvantages of the inhalation methods, which indeed still present one of the major risks in every surgical procedure. Damaged kidneys with varying degrees of uremia, defective hearts through age or toxemia, arteriosclerosis, the widespread changes of senility, which are involved so commonly in urological problems, offer particular arguments in this field against the use of ether, whether alone or with nitrous oxid, if it can be avoided reasonably and replaced by a suitable substitute. Regional anesthesia offers brilliant possibilities. It will play a most important rôle in the surgery of the future, and the urologist should be especially active in its development. This paper is intended to relate briefly experiences with spinal anesthesia in our clinic during the past year, during which time we have made a definite effort to study its benefits and limitations in genito-urinary surgery. In this series (40 cases) the spinocain of Pitkin has been used in every case, and the technique which we find most satisfactory is as follows:

As a part of the mental preparation, the details of the method are never discussed with the patient. He is told merely that his operation can be done comfortably with novocain and that it probably will not be necessary in his case to use either gas or ether. The lessened discomfort in the convalescence is emphasized. During the night preceding the operation, mild sedatives are given and every effort is made to secure restful sleep. For the actual preliminary medication, we use morphine. This is given, one-quarter grain hypodermically, one hour and a half before going to the operating room and again, one quarter grain or less depending upon the effect already obtained, one hour later. We have abandoned hyoscin because of the excitement stage that it occasionally produces. Barbital has been recommended, but we have not found it necessary. When the first dose of morphine is administered, all of the other preparations for operation should have been completed. Shaving and scrubbing the skin, cleansing the bowels, visits of family and friends should not be permitted after this time, if the patient is to be brought to the operating room in good condition for the most effective spinal anesthesia. Rather, the room should be darkened and the ears filled with cotton, if necessary, to exclude, as far as possible, all external stimuli in order to obtain the maximum degree of narcosis.

The anesthetic itself should be given calmly and quietly and always in a room apart from the operating room. It is of great importance also, as Pitkin has emphasized, to avoid at this time and during the operation all questions concerning the degree of anesthesia and all unnecessary comments relative to the instruments and the actual procedure. Conversation of this sort serves only to awaken apprehension in the patient. It is quite easy to determine the effect obtained without clumsily asking whether this or that sensation can still be felt.

When the patient is returned to bed, the hypodermoclysis is given, usually beneath the fascia lata in the anterior thighs, in a field still anesthetic. This avoids the necessity for the subpectoral infusion which, in a conscious patient, seems often to cause more discomfort than the operation itself. Finally, narcosis should be continued, of course, as long as necessary to maintain physical and nervous comfort. With this general program we find almost no mental hazard in spinal anesthesia and the neurotic person need not be feared.

The ephedrin-novocain solution (1 c.c.) is placed in the skin prior to the introduction of the spinal needle, but in some cases with very low blood pressure 2 ampules (2 c.c.) are used instead of one. This gives a sharper primary elevation in vascular tension so that any subsequent fall will not reduce the pressure to a level dangerously below the original reading. The site of puncture is usually between the second and third lumbar vertebrae, but varies, of course, with the height of anesthesia desired. For operations upon the kidney, for example, quicker, higher effect may be obtained by using the first lumbar interspace. There is no difficulty and apparently no danger in these cases in producing an upper level of anesthesia as high as the nipple-line.

The patient is always in the lateral position, with the operative side uppermost where renal and ureteral lesions are involved. The table is slightly tilted, with the head downwards in all cases, and under no circumstances should the patient ever be permitted to raise the head or sit erect until the close of the operation. Failure to observe this precaution in the use of spinocain has seemed to be responsible for the accidents in other clinics that have been brought to our attention.

The 2 c.c. ampule of spinocain which is used routinely produces surgical anesthesia that will persist usually for about one hour and a half. Under unusual circumstances—as in a recent case of extirpation of the penis and all gland-

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†For record and address of author see "This Week's Issue," page 597.

bearing areas for carcinoma—we find it safe to prolong this period by the use of 3 c.c. of the solution. The degree of dilution of the spinocain with spinal fluid becomes a matter of experience and depends upon the length and intensity of the anesthesia required. In general, it may be said that the greater the dilution, the longer and the less intense is the anesthesia, because the effect is less concentrated. In the average case, we dilute the 2 c.c. (200 mg.) of spinocain with 4 c.c. of spinal fluid, completing both dilution and introduction very slowly. Where a prolonged, high anesthesia has been needed, we have diluted the original 2 c.c. with 6 c.c. of spinal fluid.

Immediately following the withdrawal of the spinal needle, the table is tilted into a Trendelenburg position which varies in degree with the desired level of anesthesia. In our experience a twenty-degree angle gives an effect which reaches approximately to the umbilicus; a ten-degree angle to the costal border; while about five degrees of angulation will reach the nipple line. Thus, in summary, the *height* of anesthesia is influenced by the site of the puncture, the amount of dilution, and the position of the patient. The *intensity* is effected chiefly by the degree of dilution, while the *length* of anesthesia varies directly with the amount of spinocain used.

We have had, thus far, no complications that could be ascribed to the anesthetic and nothing approaching a serious mishap. There have been four cases which may be classified as unsuccessful because a general anesthesia became necessary. Each of these occurred early in our experience and we now believe that only one of them represents a complete failure of the method. This case was that of a man of 59, operated upon suprapubically for the separation of adhesions between the bladder and the sigmoid—the result of a mild diverticulitis. He had had, one week before, a complete cystoscopic study under spinal anesthesia in which the re-

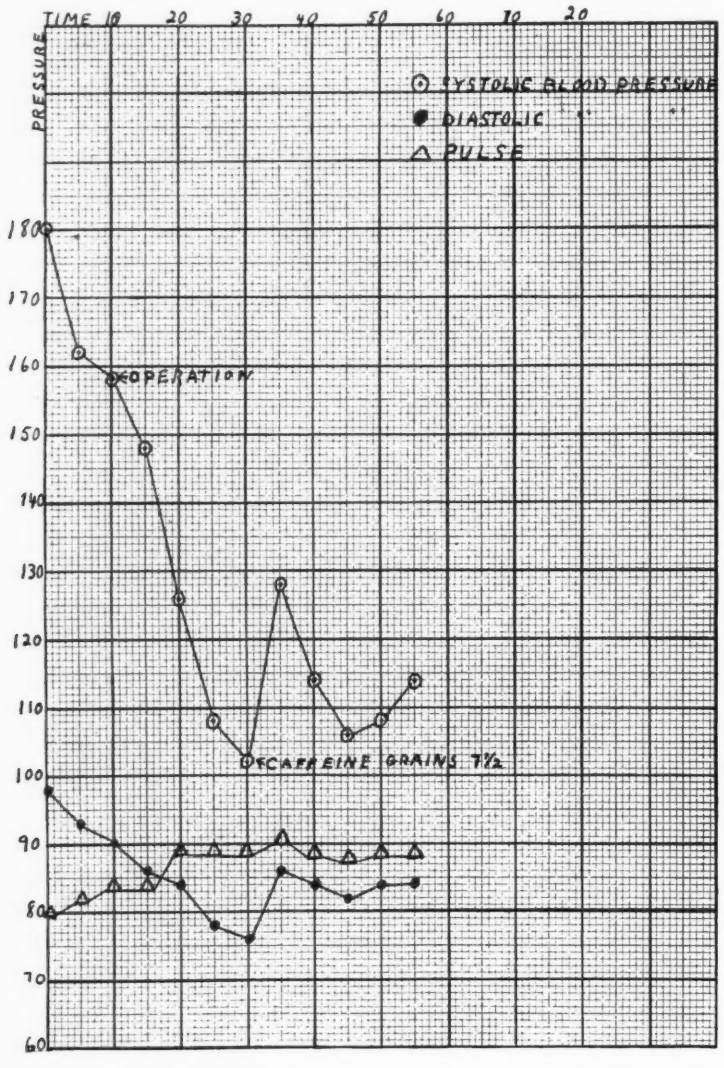

FIG. 1. Blood-pressure chart. Carney Hospital No. 232258. Suprapubic prostatectomy—second stage. Type of reaction which may be avoided with the proper use of ephedrin.

sults were perfect, the anesthesia reaching a level well above the umbilicus. At the time of operation the next higher interspace was used and the usual technique was carried out. After a fifteen-minute interval of waiting, however, there was no apparent effect and gas-oxygen-ether was resorted to. There was nothing to suggest that less of the general anesthetic was needed because of the spinocain or that there might have been advantage in waiting longer. We are at a loss to account for this situation, but we feel, in general, that such experiences must be ascribed to some failure in placing the solution accurately within the spinal canal. Variation in the solution and lack of susceptibility on the part of the patient are probably not valid excuses. The patient in question had a small pulmonary embolus, from which he recovered. He left the hospital in good condition.

The next difficulty arose in the case of a man of 66, operated upon, in September 1928, for suprapubic prostatectomy—second stage. The third lumbar interspace was used, but the anesthesia failed to extend above the level of the symphysis. In this instance, instead of turning at once to a light general anesthesia, we should have entered the bladder with novocain. The remainder of the operation, undoubtedly, could have been completed with the effect of the spinocain alone, judging from the relaxation encountered. The convalescence was short and satisfactory, and the patient left the hospital in good condition.

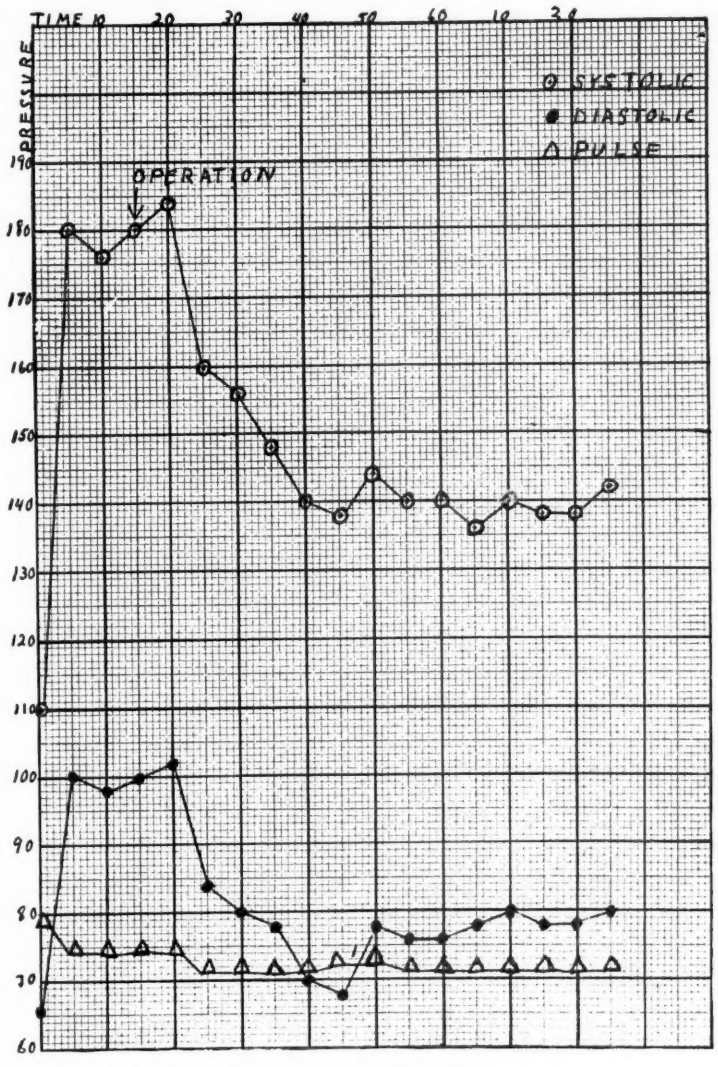

FIG. 2. Blood-pressure chart. Carney Hospital No. 282369. Suprapubic cystostomy—removal of bladder tumor by diathermy. Note that pressure is well above the original reading at the close of operation.

The third case was that of a man of 29 with calculi in a pyonephrotic left kidney. The second lumbar interspace was used for the injection (we now prefer the first interspace for kidney surgery)—and 2 c.c. of spinocain fluid were introduced. After an ample delay, there was only partial loss of skin sensation. The nephrectomy was done, therefore, with very light gas-oxygen supplemented by one ounce of ether. It is our impression now that the operation could have been carried out without the general anes-

thetic, had we used novocain in the skin. The patient recovered promptly and was discharged in good condition.

Number four was a man of 66 with extensive carcinoma of the prostate and extension of growth upon the bladder floor. The operation was a suprapubic cystotomy for the implantation of radium. In this case, skin sensation persisted longer than usual in the line of incision, and nitrous oxid was given. This was clearly a mistake, for after the short operation had been completed, it was apparent that there was perfect spinal anesthesia reaching as high as the ensiform cartilage. A little longer delay before beginning or, at the most, novocain in the skin would have sufficed. As a matter of fact, very little gas oxygen was needed, and no ether. This patient showed no signs of postoperative shock or cardiorenal embarrassment, but he developed a type III pneumonia, of which he died on the seventh day.

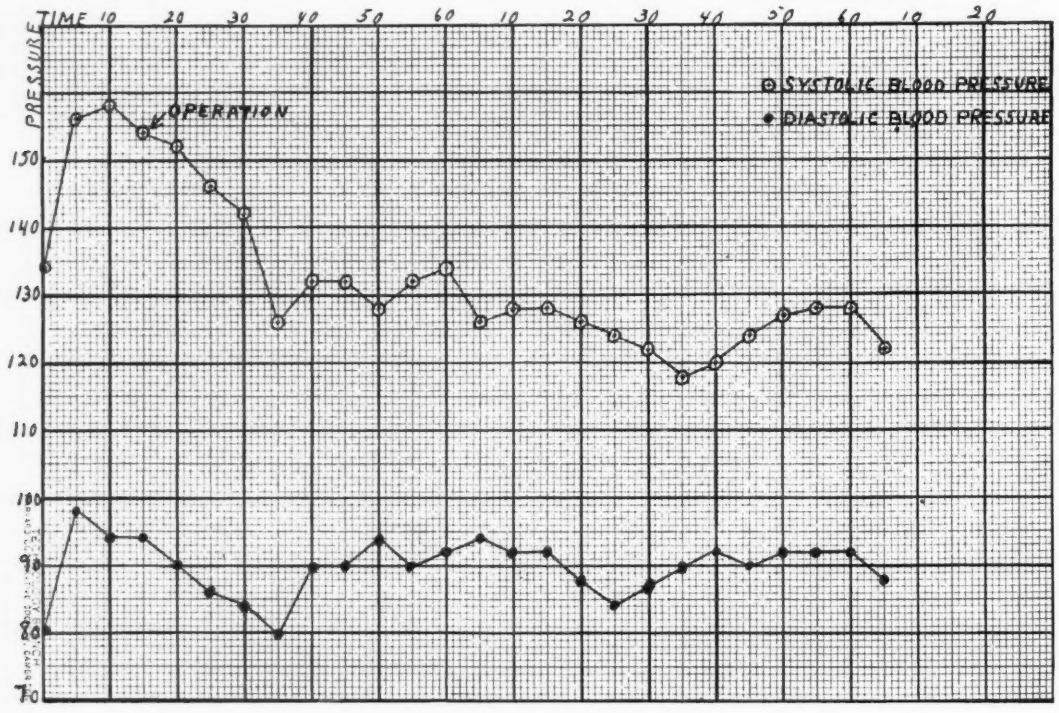

FIG. 3. Blood-pressure chart. Carney Hospital No. 282629. Excision of large diverticulum of bladder. Note slight fluctuations in spite of long operation.

An opinion concerning the merits of an anesthetic must be based upon the general effects produced in the patient as well as upon the quality of anesthesia. In our experience, there have not been serious changes of any sort with the method under discussion. With reference to the nervous system, for example, we have observed no significant reactions. There has been no headache; and no post-operative mental confusion such as may result from cerebral anemia (and possibly thrombosis in extreme cases) following a sharp fall in blood pressure in arteriosclerotic patients in whom the cranial circulation has lost its ability to adjust itself to sudden changes in tension. The control of the height of anesthesia and the stabilizing of blood pressure with ephedrin are important factors in avoiding mental disturbances in the newer technique.

The gastro-intestinal tract, also, has been affected but little. There is occasionally slight nausea—infrequently vomiting—during the operation, but it has never been sufficient to disturb the patient or the surgeon. We feel that this nausea results from apprehension or morphin and not from the spinal anesthetic itself. We have not found a lowered blood pressure in these cases. Serious post-operative difficulties have been absent. The distressing vomiting that so often follows a general anesthesia is happily avoided and these patients are able to resume at once their regular program of fluids and nourishment. The greatest advantage, however, has seemed to lie in the avoidance of distention and ileus. There is no more serious complication in abdominal surgery than paralytic ileus and we feel that the likelihood of its occurrence is materially lessened by the use of spinal anesthesia. In this connection the paper of Studdiford with reference to the use of spinal neocain in the treatment of ileus is of interest.

The incidence of post-operative pulmonary complications should be diminished also, as compared with the inhalation methods—a very cogent argument in favor of the spinal technique, especially in those cases in which, for one reason or another, the lungs present a particular hazard. Unfortunately there will be no immunity to pulmonary infections whatever the

anesthetic. We have had one serious complication of this sort following spinal anesthesia. This occurred in a man of 54 with a suprapubic prostatectomy. He had been in the hospital for three weeks before operation, but at a time when the incidence of acute, respiratory infections was very high throughout the community. He developed a lobar pneumonia involving the right lower lobe, and died on the ninth post-operative day.

The chief objection to spinal anesthesia in the past has been its effect upon circulation. The sharp fall in blood pressure which so often occurred added materially to the danger of the operation, particularly in aged, arteriosclerotic subjects, and produced many of the untoward symptoms. This acute hypotension was brought about in the following manner, as described by Babcock in 1926. "From the second thoracic to the third lumbar, the anterior nerve roots carry white rami which supply through the intervening ganglia the blood-vessel walls of the entire body. The fall in blood pressure during spinal anesthesia depends on the number and position of the anterior nerve roots blocked by the drug. When all the nerve roots carrying the white rami are interrupted there is vasoparesis of the entire body."

The drop in blood pressure, therefore, is in direct ratio to the number of white rami anesthetized. With the older forms of spinal anesthesia, in which crystals of the anesthetic were dissolved in the spinal fluid, a much higher effect than was desirable or necessary was often produced and hence a greater depression in vascular tension. The height of anesthesia could be controlled only indirectly by the selection of the interspace used for injection. The actual spread of effect could not be controlled. On the other hand, with the newer technique, employing a lighter than spinal fluid preparation, such as spinocain, the height of anesthesia can be governed directly by the angulation of the table, as well as by the level of injection and the degree of expansion of the anesthetic mass.

The use of ephedrin also has proved of the greatest assistance in avoiding sharp fluctuations in blood pressure. There must, of necessity, be some degree of depression in vascular tension with any form of spinal anesthesia and, in our experience, the preliminary use of this drug has produced an initial rise in pressure which has successfully counterbalanced this effect. If, for any reason, further lowering of blood pressure takes place during the course of the anesthesia, ephedrin sulphate may be repeated to combat this tendency through its pressor influence upon the vasomotor fibres still untouched by novocain. A possible cumulative effect must be borne in mind, however, and the pressure closely watched when successive doses of ephedrin are used. We find caffein and adrenalin much less efficacious than ephedrin in maintaining circulatory equilibrium.

With the method outlined, we have found no difficulty in stabilizing blood pressure. We have had but one case—early in our series—in which a significant drop occurred (Fig. 1), a patient with marked arteriosclerosis who was given no ephedrin after the preliminary dose. We now feel that such sharp reactions may be avoided. Our average initial rise in pressure within five minutes following the first ephedrin is about 30 mm. Hg. The average time before the manometer reading returns to normal — when such return takes place—is approximately thirty minutes.* It is easily possible to bring the patient to the close of operation with a blood pressure slightly above, or at the most not more than 10 to 15 mm. Hg. below, the original level.

We have used the method under discussion for operations upon every level of the genitourinary system—from kidney to external genitalia—and we have found it thoroughly adequate. For work upon the kidney, in particular, we feel that it solves many problems. We quite agree with the recent conclusions of Jeck and others that renal surgery may be rendered easier and less hazardous by the use of controllable spinal anesthesia. A case of extensive carcinoma of the kidney, seen within the past few months, lends emphasis to this opinion.

The patient was a man of sixty-two with a large solid tumor of the left kidney, filling the flank and reaching to well below the iliac crest. He was operated upon for the relief of pain and bleeding. A long lumbar incision was used below and parallel to the twelfth rib, but because of the size of the mass, it was necessary to reach the vascular pedicle transperitoneally. The descending colon was displaced towards the mid-line for better exposure. There was much more manipulation than is needed in the average nephrectomy, but the patient experienced no discomfort. The operation was greatly facilitated by a complete muscular relaxation and a quiet peritoneum, not obtainable to the same degree with nitrous oxid or ether. There was also a marked lessening of the respiratory excursion of the kidney as compared with the vigorous movement that is so often encountered under general anesthetics. I am convinced that this difficult nephrectomy was accomplished far more easily and quickly, and with much less trauma to the patient, through the use of spinal anesthesia. The convalescence, moreover, was comfortable and absolutely uneventful. In particular, there was no abdominal distention—a fact due, we believe, to the lack of need for forceful manipulation of intestines in an effort to crowd them away from the operative field.

In operations upon the ureter, we have had some evidence to suggest that there is a contraction of this structure under spinal novocain, analogous to that which has been described in the bowel. In one case of ureterotomy, this was sufficiently marked to add a little to the difficulty

*Babcock states that "conduction through the white rami, with a gradual increase in the blood pressure, usually is resumed about twenty-five to thirty minutes after the induction of spinal anesthesia."

of extracting a small stone from an otherwise normal ureter. The ureteral caliber seemed reduced by tonic contraction almost to that of a vas deferens. We would be interested in the experiences of others in this regard.

For operations upon the bladder and the lower organs of the genito-urinary tract, spinal anesthesia is too well established to need further defense. For the suprapubic surgery of the bladder and prostate, especially, we believe it to be the method of choice. Age and toxemia often combine in these cases to render a general anesthetic unsafe but, apart from these considerations, there are positive advantages of the greatest importance in the spinal technique. The chief of these are muscle relaxation, relaxation of the bladder itself and the "silent peritoneum"—all of which serve to minimize the difficulty and trauma of the operation and the discomfort of the convalescence.

In the several instances in which we have had occasion to try spinal anesthesia for cystoscopic study, the results have been entirely satisfactory. There has been no evidence of diminished diuresis or depression of kidney function.

CONCLUSIONS

Controllable spinal anesthesia possesses distinct advantages in genito-urinary surgery and, it is in properly selected cases, adequate for every type of urological procedure.

With ephedrin, properly used, marked changes in blood pressure may be avoided.

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THE END RESULTS OF OPERATIONS FOR NEPHROPTOSIS AND ABERRANT RENAL VESSELS*

BY EDWARD L. PEIRSON, JR., M.D.,† AND J. DELLINGER BARNEY, M.D., F.A.C.S.†

AS a whole, the profession is sceptical as to the benefits to be derived from operations performed for nephroptosis. It is doubtful as to when they should be done and whether they should be done; it is particularly uncertain as to whether a kidney once fixed in a new and presumably better position will remain there for any length of time. Thus has the pendulum swung from its position of a generation or less ago, when any unduly low or movable kidney was at once held responsible for whatever ailment the patient might have, and was as promptly suspended in one way or another.

In an attempt to form our own opinion of the subject in hand, we have thought it worth while to study the cases admitted to the Urological Department of the Massachusetts General Hospital during the past ten years. Nephropexy, generally combined with mobilization of the upper ureter, has been performed in 58 cases; in six more, aberrant renal vessels, causing obstruction at the uretero-pelvic junction, have been divided. In this latter group the kidney was often found to be abnormally low and movable. Of these 64 cases we have satisfactory post-operative data in 46, and it is on these cases that we shall base our remarks.

A review of the literature uncovers numerous articles on the subject of nephroptosis, many of which deal very thoroughly with its etiology and symptoms. As this communication concerns itself only with results, it seems sufficient to state that nephroptosis is a condition much more commonly found in women than in men, and more commonly on the right side than on the left. That nephroptosis is very frequently found where it gives no symptoms and needs no treatment is well known. Apparently a low position and undue mobility of the kidney is dependent on a congenital inefficiency of its supporting mechanism, with or without the addition of other factors, such as marked and long-continued loss of weight, general ptosis, poor posture, trauma, pregnancy, and the like.

The typical symptoms of nephroptosis associated with intermittent hydronephrosis are often the same as those of renal calculi. The patients are generally young adults, and usually complain of pain in the costovertebral angle, which may or may not radiate to other parts of the abdomen. The pain is most frequently in the form of sharp attacks lasting several hours and often requiring morphine, but it may be of a dull, steady character. Not uncommonly the pain is relieved by lying in certain positions which allow the kidney to return to its normal place. The passage at any one time of a large amount of urine with relief of symptoms seems to be a rare phenomenon. About 50 per cent. of the patients have various urinary symptoms, and some even show gross hematuria or pyuria. Loss of weight and gastric disturbances are commonly a part of the picture. The kidney can be held responsible for the symptoms only after all other causes of pain have been excluded, and cystoscopy and pyelography have been done. The pyeloureterogram is of the greatest importance in the diagnosis. This should be done with the patient in the upright posture, thus allowing the kidney to assume the lowest possible position. If the picture is taken with the

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patient lying flat, the kidney may remain in a relatively high position, and a kinking of the ureter which may occur when the kidney drops down may not be apparent. It is also important to withdraw the ureteral catheter almost to the bladder, not only to prevent the artificial production of a ureteral kink, but also so that a kink, apparent or real, may not be obliterated by the catheter in the ureter. Typically, the X-ray picture shows a low kidney, a marked kink of the ureter at or just below the ureteropelvic junction, and more or less dilatation of the pelvis or calices.

The sharp angulations of the upper ureter seem to be due to the fact that it is fixed to the peritoneum 4 or 5 cm. from its upper end[1], so that ptosis of the kidney tends to produce an angulation at this point. If the ureter is very firmly fixed by bands of adhesions or by the crossing of an aberrant vessel, a very small amount of nephroptosis may produce a very sharp angulation of the ureter. Another variety of kink, also occurring at the upper end of the ureter and more or less in the form of a letter S, is also seen in certain cases. As has been pointed out by one of us (J. D. B.)[5], this may be due to a localized weakness either of the wall of the ureter itself or of its supporting sheath. In either case there seems to be an excessive length of ureter. It is, in our opinion, a kinking of the ureter, producing poor kidney drainage and increased intrapelvic pressure, which causes the symptoms found in nephroptosis. In other words, neither the low position nor the mobility of the kidney is *per se* a cause of symptoms; for were this the case, we might expect to see more cases of Dietl's crises due to this cause, inasmuch as Kelly and Burnam, as quoted by Mathé[1], found low kidneys in 22.8 per cent. of women in 7855 autopsies. This view is well supported by the fact that the pain complained of by these individuals can frequently be reproduced by over-distention of the kidney pelvis.

Ureteral kinks, like nephroptosis, are commonly found in cases without associated symptoms. Livermore[2] found them in 10 per cent. of 2000 cases. Likewise, Smith and Ockerblad[3] found that obstruction and dilatation of the ureter may cause secondary kinking. The significance of an apparent kink is not always easy to determine. As has been pointed out by Cole[4], we see the ureter in a ureterogram in but one plane. What may appear in the anteroposterior view to be a sharp angulation might in reality, if seen laterally, be only a gentle curve. That kinks may in themselves definitely cause obstruction to outflow of urine is, we believe, a fact. We have had 16 cases with kinks showing some dilatation either of the pelvis or calices, for which there was no other demonstrable cause. In 12 of these cases relief was obtained by straightening out the ureter, and in 7 cases pyelograms done after the kinks had been obliterated showed the renal pelvis to be reduced in size. We cannot, however, agree with Braasch's view[5] that a kink, to be of significance, must necessarily show dilatation of the kidney pelves, as we have in our series 5 cases of kinked ureters without pyelectasis, which have been completely relieved by nephropexy. Our view is also supported by Sisk[6], in a paper discussing ureteral kinks. Probably the most satisfactory way to estimate the significance of ureteral kinks is to determine whether or not the kidney pelvis has emptied itself in the normal time. It has been shown by one of us (E. L. P., Jr.)[7], that the normal kidney pelvis is empty, or nearly so, of the pyelographic medium, at the end of nine minutes. Should the kidney pelvis, in spite of kinking of the ureter, be empty in the normal time, it seems safe to assume that the kink cannot be of much significance. The converse of this, however, is not necessarily correct, as various functional factors may delay the kidney drainage.

The results of nephropexy as reported in the literature are extremely good. Bell[8] reports 73 per cent of cures with the rest improved, in his first series of 100 cases, and 94 per cent in his second series of 50, in which group he usually operated on both sides. He omits, however, to state how long these cases were followed. He says that he has not seen a cure from the use of abdominal belts in any of them. Any belt, he believes, which exerts pressure enough to keep the kidney in place, will cause ulceration of the skin. Hammond[9] likewise believes that belts are useless, and that nephropexy is the procedure of choice when there is vomiting, definite attacks of renal colic, or hydronephrosis. Burford[10] reports 88 per cent of cures, 10 per cent improved, and only one failure, in 48 cases. The failure was subsequently cured by a second operation which freed the ureter. All the pyelograms shown in Burford's article showed marked hydronephrosis before operation.

In a very thorough review of the subject Mathé[1] reports 90 cases. Thirty of these had nephropexy, with relief in 25, some relief in 3, and failure in 2 cases. Half of these cases had already tried abdominal belts without relief. The other 60 cases were treated with abdominal belts, with complete relief in 50 per cent and no relief in 15 per cent. About half of his cases had dull lumbar pain, and the other half sharp renal colic. Urinary symptoms were present in over two thirds of the cases, with hematuria in 16. Various gastric symptoms, loss of weight, and nervousness were also frequently noted. In Mathé's series the two failures from surgical treatment were due, in one case to a failure of the nephropexy to hold, and in the other to extension of infection in an already infected kidney. He concludes that the operation of nephropexy is very satisfactory, and should be used when relief is not obtained by the use of a belt, or when nephroptosis is complicated by kinking of the ureter, aberrant vessels, or adhesions hold-

ing down the kidney. Elane[11] reports 100 per cent of cures in 16 nephropexies. Billington[12] feels that belts are unsatisfactory, and that surgery is the treatment of choice for nephroptosis. He has operated on 230 cases, and states that, to the best of his knowledge, they have all been successful. In most instances these authors have not stated how long their cases have been followed after operation.

The results which we have obtained are quite at variance with those reported in the literature. Setting aside the 6 cases where an aberrant vessel definitely appeared to obstruct the ureter, we have followed 40 cases in which a simple nephropexy and freeing of the ureter was performed. The minimum time for determining the end result has been set at six months after the operation, but the majority have been followed for a period of several years. The results are as follows:

Cured	14 cases	35 per cent.
Improved	9 cases	22
Failure	17 cases	43

Here indeed is a very large percentage of failures, and it was with the idea of analyzing these failures that this paper was undertaken. In the first place, it appears evident that the failures were not due to lack of study of the cases. Every case had been cystoscoped and pyelogrammed, and had been studied from every point of view on the general service by both surgeons and internists before operation was performed. In eight of the failures the subsequent history has suggested that perhaps the wrong diagnosis might have been made, but such was proved to be the case in only two instances. In neither of these cases could the correct diagnosis have been made at the time of operation. Some of the failures were due to the fact that, as a low kidney was the only positive finding, nephropexy was done as a last resort without sufficient reason. The failures and partial failures seemed generally to have one very noticeable condition in common, namely, marked neurosis and a bad posture. (Figure 1*a*) is a good example of this. Here we see a very low kidney, with a kinked ureter and some dilatation of the pelves. The pyelogram (Fig. 1*b*) done six months after operation shows the kidney high, the ureter straight, and the pelvis smaller. In this instance, although the anatomical result is good, no relief was obtained, because we were dealing with a patient with neurosis and ptosis developed to a high degree.

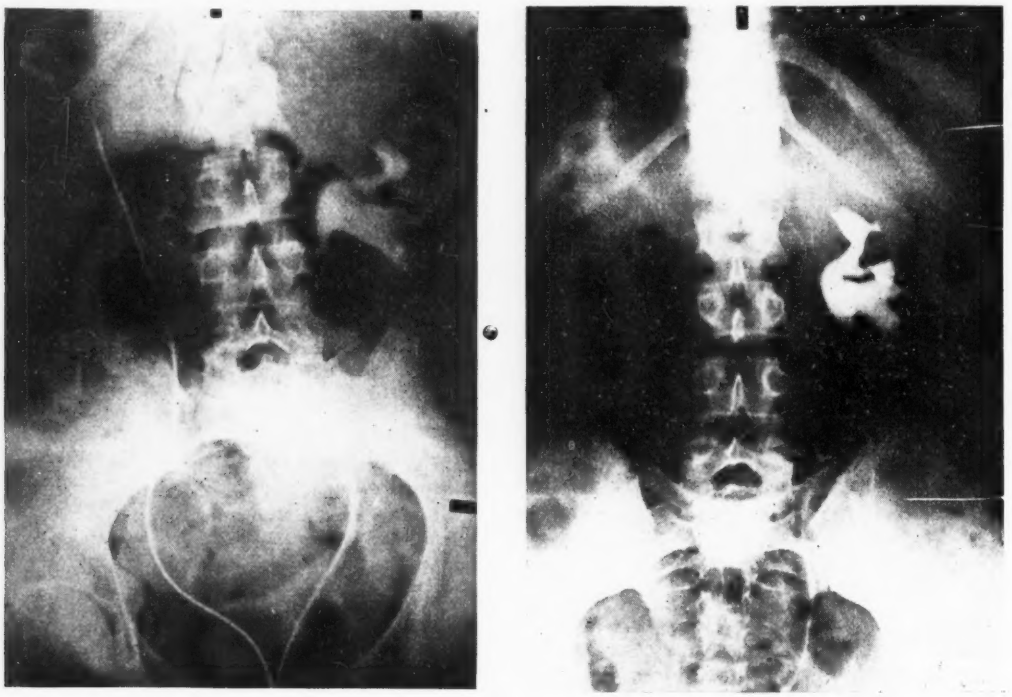


FIG. 1.

(*a*) (*b*)

(*a*) A case showing before operation a very low kidney on the right side, in a woman with marked kinking of the ureter and slight dilatation of the pelvis. (*b*) Six months after opera tion shows the kidney higher, the ureter straight, and less dilatation of the renal pelvis. There was, however, no relief of symptoms by operation, but she was much improved by an abdominal belt.

In performing nephropexy we have followed Albarran's technique, modifying it to meet the conditions if we saw fit, and for the most part not suturing the upper end of the split capsule to the twelfth rib with an encircling suture. We have simply split the capsule its entire length over the greater curvature of the kidney,

and separated it completely from the kidney, the idea being to create as wide a surface as is possible for the formation of adhesions. Each half of the capsule has then been sutured by two stitches to the fascia, that of the anterior half to the anterior edge of the abdominal incision, and the posterior half to the opposite edge. In each instance a point on the capsule has been chosen which, when sutured to the abdominal wall, would hold the kidney most favorably. It is our belief that it is important to have the kidney firmly fixed in such a position that its ureter is perfectly straight and offers free drainage. For this reason it is advisable to free the upper two inches of the ureter.

From an anatomical point of view we have found this operation about 90 per cent efficient. All but eight of the cases have been seen by us or some other member of the Staff, and 20 cases, for the most part the unsuccessful ones, have been pyelogrammed after operation. Three of these were done before the patient left the hospital, half of the rest at the end of five or six months, and the remainder after several years. The post-operative examination of 32 of the 40 cases revealed but two in which the kidney had again resumed its position of ptosis, and one in which the kidney was so rotated by the nephropexy that a second operation was necessary. In all the other cases in which a pyelogram was done, not only was the kidney in a satisfactory position, but also, the ureter was free from kinks, even when the patient was in the upright position. Where dilatation of the pelvis had been present before operation, the post-operative pyelogram usually showed a distinct reduction in size.

If we compare the group of failures with the successful cases, we find no definite set of conditions upon which we can lay our finger and state that, if these are fulfilled, the case will be successful. However, in spite of many exceptions to the rule, we see a certain trend distinguishing the two groups. Four cases showing advanced hydronephrosis were all cured. The cases showing slight blunting of the calices or questionable dilatation of the pelvis, which we have classified as early hydronephrosis, showed a greater percentage of cures than that shown by those cases without any dilatation. The majority of the cases showed kinked ureters; but where the ureter was not kinked, the operation almost always resulted in a failure. This is in accord with our view that the symptoms of nephroptosis are dependent on the associated ureteral kink, which may interfere sufficiently with renal drainage to produce a dilatation of the pelvis; accordingly a greater percentage of successful results has been obtained where there was marked kinking of the ureter and also where there was some dilatation of the pelvis. The group of failures contained most of the indi-

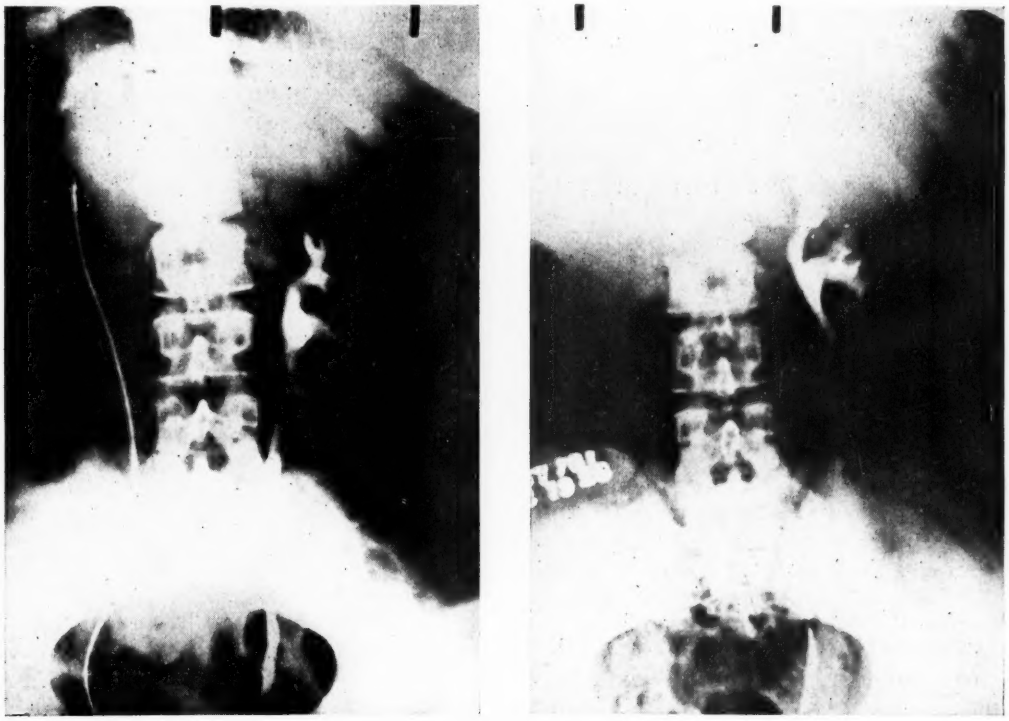


FIG. 2.

(*a*) (*b*)

(*a*) A case of severe persistent pyelitis, showing before operation marked ptosis and kinking of ureter. (*b*) Six months after nephropexy, showing an anatomical cure with relief of symptoms.

viduals classified as very thin or very obese, while the successes were generally in individuals of normal weight. Likewise there was a much lower percentage of failures in the operations performed on men than in those on women, presumably because of the lesser amount of neurosis and ptosis in the former class.

Although there were far fewer operations on the left kidney than on the right, the percentage of failures of operations on the left side was three times that on the right. The patients who had complained of severe pain were most likely to be cured, but the location of the pain seemed to make no difference. Neither did the presence of pus cells in the urine at the time of operation (nearly 50 per cent), or urinary symptoms, appear to influence the results. Thus, although there is no one definite preoperative finding separating the successful cases from the failures, there are numerous factors which appear to be directly related to the eventual outcome in any given case. Of these factors, hydronephrosis and sharp kinking of the ureter are the most important. Crabtree and Shedden[13] believe that the persistence of pyelitis in one third of the cases which they reported was due to nephroptosis or kinking of the ureter. In this connection it is important to note that the pyelitis, if present before operation, was cured or greatly improved in 70 per cent of our cases in which a postoperative urine examination was made.

Although, as previously stated, most of the authors seem to feel that abdominal supports in this condition are of little value, many of our cases who had not been benefited by operation have been much relieved by wearing a belt. Twenty patients in whom the operation was a failure, or partial failure, have worn simple abdominal belts, and all but two have obtained considerable relief by this measure. From this fact we conclude that the symptoms of which they complained, although they appeared to come from the kidney, were in reality due to ptosis of other abdominal organs and to poor posture. Also one must not overlook the undoubted psychic factor as an element in the relief of these cases which were given abdominal supports. Although it has frequently been stated that an increase in the amount of fat around the kidney, indicated by a gain in weight, is of the utmost importance in the cure of this condition, we did not find this to be the case. The majority of our successful cases did not gain weight, whereas half the unsuccessful cases did.

Exactly the same clinical picture is seen in cases where an aberrant vessel obstructs the ureter as in simple ptosis, but in these cases the results of operation are much more satisfactory. One individual out of every 20, according to Sanford[14], has aberrant vessels running to the lower pole of the kidney. This, however, does not necessarily mean that they obstruct the ureter. The vessel must be in such a position that it crosses the ureter so as to obstruct it, or the kidney must drop down, allowing the ureter to kink itself over the vessel. In view of the excellent results obtained by cutting the vessel, we believe that they are the primary cause of the hydronephrosis, and not, as do Sanford[14] and Geraghty and Frontz[15], that they obstruct only secondarily after an already dilated pelvis and ureter has dropped down over an abnormal vessel.

The symptoms of aberrant vessels are usually those of severe attacks of renal colic, coming on suddenly at intervals of several days to several months. Dilatation of the kidney pelvis proceeds rapidly, and frequently the condition is not recognized until the kidney has been completely destroyed, leaving only a hydronephrotic sac (Fig. 3). W. J. Mayo[16] reports that, in 20

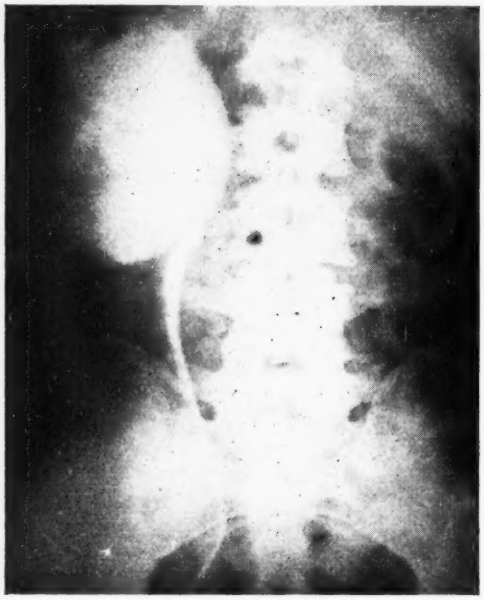


FIG. 3.

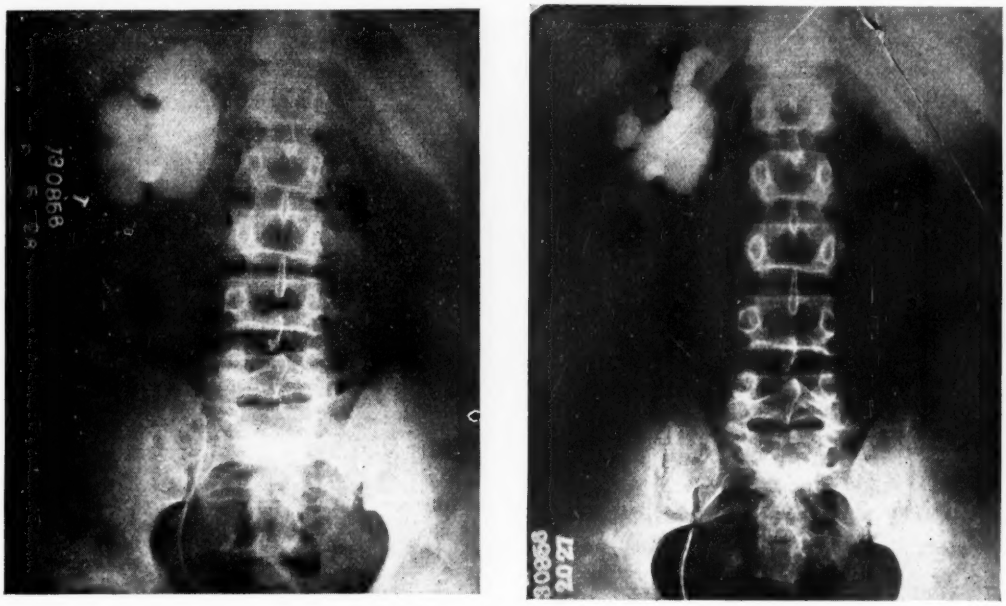
Marked hydronephrosis resulting from long-continued back pressure from an aberrant vessel. This illustrates the need of early diagnosis and treatment. Nephrectomy was finally done.

out of 27 cases of otherwise unexplained hydronephrosis, aberrant vessels were present. In 13 of these a simple resection of the vessel was sufficient to produce a cure. Sanford[17] reports 8 cases and states that simple resection of the aberrant vessel and constricting bands, associated with nephropexy to straighten the ureter, gave satisfactory results. According to Belt and Joelson[18], all the arteries in the kidney are end arteries, and the division of one of them causes infarction of the area of the kidney supplied by that vessel. For this reason, as the obstruction is usually caused by an artery, Quinby[19] advises, instead of cutting the vessel if it is of any considerable size, that the ureter be cut off and implanted in another portion of

the pelvis where it cannot be obstructed by the vessel. This procedure we believe to be unnecessarily radical, as we have never seen any harm come from the resection of the artery, although a portion of the kidney is presumably destroyed. Kummer[20], reviewing 56 cases from the literature, states that he could find no evidence of harm coming from the resection of an obstructing aberrant vessel, and considers it to be the operation of choice.

Pyeloureterogram of a case of aberrant vessel may show one of several pictures, none of which are pathognomonic of the condition. Sharp angulation of the ureter at the ureteropelvic junction is sometimes seen. Crabtree[21] has pointed out that the absence of filling of the ureter at the ureteropelvic junction is very suggestive of a vessel occluding the ureter at this point. Foley[22] says that a tendency toward duplication of the pelvis in the presence of unexplained hydronephrosis is presumptive evidence of the presence of an anomalous vessel. Sanford speaks of an incomplete pyelogram, where only the ureter shows, as a frequent occurrence in these cases. The most frequent finding in our experience has never, so far as we know, been mentioned before. We have found that, when a pyeloureterogram is done in the routine manner, one frequently sees only a sharply outlined and generally dilated pelvis, with little or no opaque solution in the ureter. (Fig. 4*a*.) The sodium iodide injected into the ureter has run out, and the obstructing vessel has apparently prevented more fluid running down from the kidney to take its place. Any one of these signs may, however, be seen in a case where there is no aberrant vessel. As the condition may be, and often is, bilateral, with symptoms only on one side, we believe that a pyeloureterogram should be done on each side, either at one or, preferably, at two sittings.

In our series there were 6 cases where an abnormal renal vessel appeared definitely to obstruct the ureter. These cases were all young adults, four of whom were males. The condition was present on the left side in four cases, on the right in one, and was bilateral in the remaining case. They had all complained of severe attacks of pain in the costovertebral angle over a period of about two years. Four cases showed marked hydronephrosis. In all, the obstructing vessel was cut, and in three, a nephropexy was also done to take up the slack in the ureter. These cases have been followed from one and a half to four years and the results are —five cases cured and one relieved for two years. Three of the cases have been pyelogrammed, one three weeks, one five months, and one eleven months post-operative. All of these post-operative pyelograms show a great reduction in the amount of dilatation of the pelvis, and the ureter free of any obstruction. The very excellent results obtained in these cases where there was an obstructory aberrant vessel are in marked contrast to the results obtained where there was simple nephroptosis.



(*a*) FIG. 4. (*b*)

(*a*) Shows marked dilatation of renal pelvis caused by an aberrant blood-vessel with entire lack of filling of ureter. (*b*) Shows marked decrease in dilatation of pelvis and calices, 11 months after division of the aberrant vessel, with entire relief of symptoms.

SUMMARY

Concisely stated, our views on this subject are as follows:

Nephroptosis is a common finding, which gives symptoms only when it produces sufficient

kinking of the ureter to interfere with the drainage of the kidney.

The operation of nephropexy, as described, is technically very excellent, but, in our hands at least, has often failed to give satisfactory results.

We believe that the operation should be performed only after an exhaustive study of the case has ruled out all other causes of symptoms, and after a complete urological examination has been made with a pyeloureterogram, with the patient in the upright posture.

If there is definite hydronephrosis with kinking of the ureter, or a suggestion of an aberrant vessel obstructing the ureter, we advise operation without any preliminary treatment. In the absence of these findings, we believe that the patient should first have orthopedic and medical treatment, and that operation should be advised only after failure of these measures.

In general, the operation is more successful where there is hydronephrosis and kinking of the ureter. Likewise, it is more successful in men than in women, on the right side more than on the left, and where there has been a history of severe pain and the patient is one of average weight. Any pyelitis present frequently clears up after operation.

Our failures in a great majority of cases can be traced to general abdominal ptosis and neurosis. This condition should have careful attention. A well-fitted abdominal belt generally gives relief to cases which have not been cured by the operation.

Excellent results are obtained in cases where there is an aberrant vessel obstructing the ureter by simply cutting the vessel and suspending the kidney if the ureter is redundant.

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POSITION IN THE TREATMENT OF FRACTURE OF THE CARPAL SCAPHOID*

BY DAVID BERLIN, M.D.†

SINCE proper position with good surface contact of broken fragments is our best hope of obtaining bony union in the treatment of early recognized fractures of the carpal scaphoid, it behooved us to ascertain which position of the hand would give this desired surface to surface approximation of fragments. Accordingly, at the recommendation of Dr. F. J. Cotton, an anatomical experiment was carried out involving a careful study of the dissections of sixty wrists. The results of this investigation are perhaps convincing enough to settle the existing controversy questioning the efficacy of extension and favoring, upon the other hand, volar radial flexion as the position of choice in the treatment of scaphoid fractures.

In a very admirable monograph on "Traumatic Injuries of the Carpus", Dr. Kellogg Speed[3] writes that "In a position mid-way between flexion and extension the fragments lie in a normally relaxed position favoring a maximum blood supply to the bone". If we grant that flexion and extension of the wrist collectively describe an arc of approximately 135° and of this the excursion by extension equalling about 75°-80°, we can, therefore, reason that in this mid-position of the arc the hand is in slight extension, i.e., about 15°-20°. Instead of subscribing to this position Speed further goes on to advise placing the hand in volar radial flexion. Our findings are totally at variance with the latter recommendation.

As represented in the diagrammatic sketch extension to about 40°-50° with slight radial deviation invariably gave the best uniform contact of surfaces. Beyond this point approach-

*Read before the American College of Surgeons at a meeting held at the Boston City Hospital, October 12, 1928.

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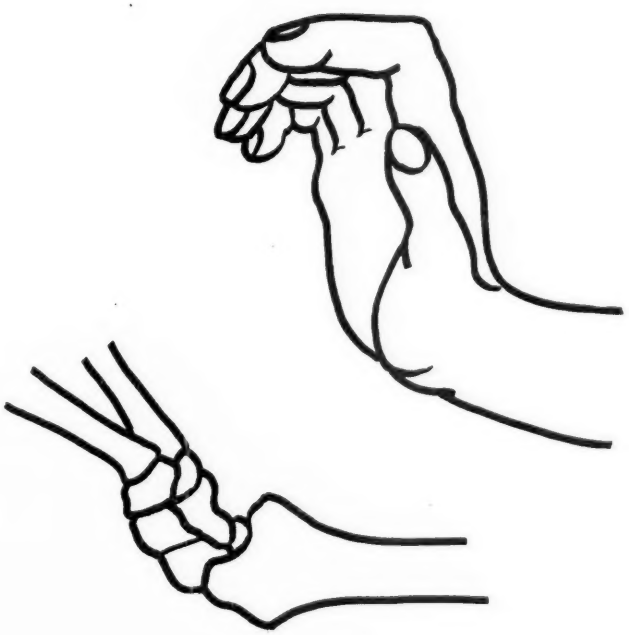
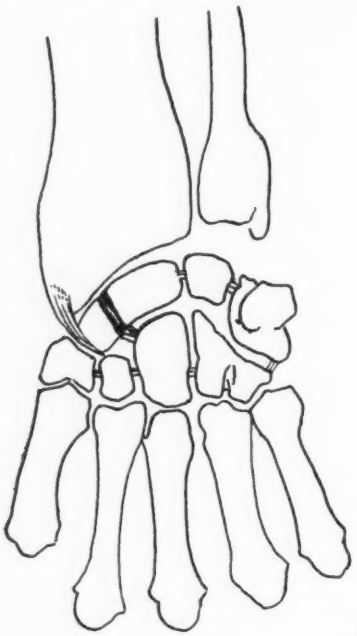
HAND IN FLEXION. SCAPHOID FRAGMENTS SEPARATED.

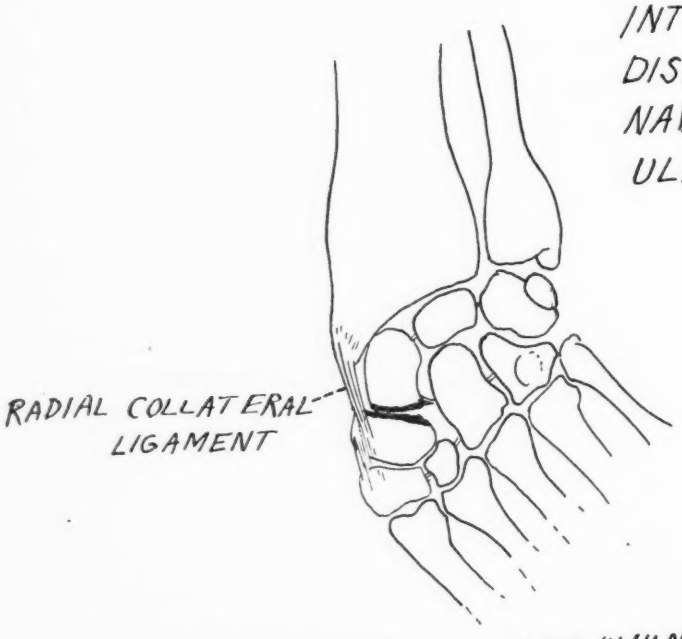


HAND IN EXTENSION GOOD APPROXIMATION OF SCAPHOID

ing extreme extension, there was evidence of the distal fragment carried along with the corresponding distal row of carpal bones to override the proximal fragment, thus creating a gap between the margins of the fragments on the palmar aspect. It was further noted that from the very beginning of flexion, viewed from the dorsal surface, the fragments were increasingly separated, although on the palmar side the margins were approximating one another and in extreme flexion were in light juxtaposition while, at the same time, the maximum gap obtained dorsally. At no point in the arc of flexion were the fragments uniformly apposed. Apropos of this, reasoning on the assumption that pain is elicited if the fragments are stoutly brought together, it appears that the symptomatology coincides with the anatomic findings; for Dr. Cotton has clearly pointed out that there is inability to carry the hand to the radial side without pain, a similar disability as to extension while motion is free in flexion and ulnar adduction.



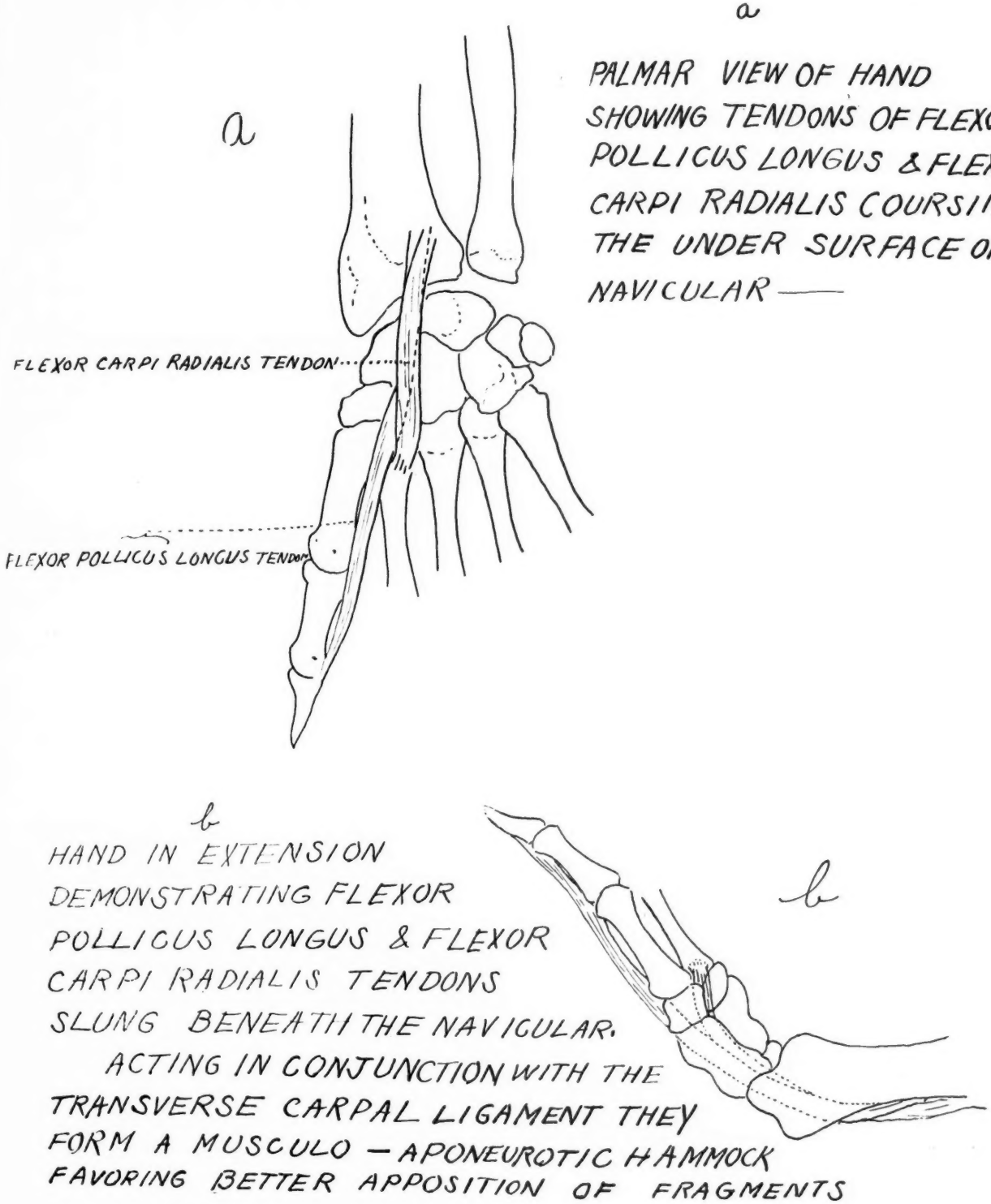
DIAGRAMMATIC REPRESENTATION OF RADIAL COLLATERAL & INTEROSSEOUS LIGAMENTS DISPLACING FRAGMENTS OF NAVICULAR WITH HAND IN ULNAR DEVIATION —



DISPLACED FRAGMENTS — HAND IN ULNAR DEVIATION

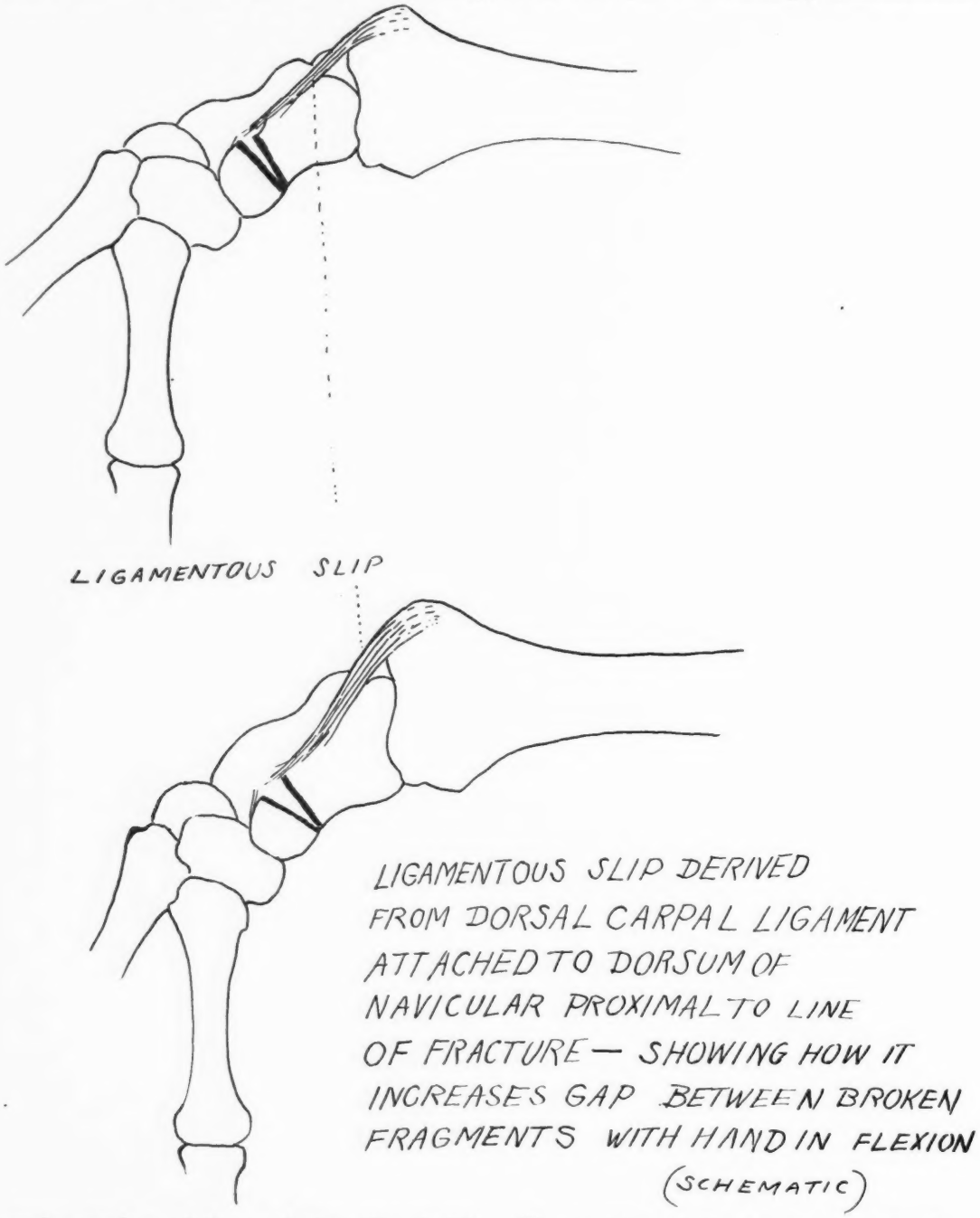
It was possible to show in all of the speci-

mens, without noteworthy variation, that the bulk of the ligamentous structure springing from the dorsal carpal ligament gained attachment to the proximal two-thirds of the dorsal surface of the navicular (O. T. Scaphoid) i.e., proximal to the somewhat constricted mid-portion of the bone; sometimes referred to as the neck. It is, therefore, logical to state that in fractures involving the neck, and these probably constitute the majority type, the hand in flexion would place the dorsal ligament under stretch and by this same token tend to pull the proximal fragment away from the distal one. This was practically demonstrated.


a
PALMAR VIEW OF HAND SHOWING TENDONS OF FLEXOR POLLICUS LONGUS & FLEXOR CARPI RADIALIS COURSING THE UNDER SURFACE OF NAVICULAR
a
FLEXOR CARPI RADIALIS TENDON
FLEXOR POLLICUS LONGUS TENDON
b
HAND IN EXTENSION DEMONSTRATING FLEXOR POLLICUS LONGUS & FLEXOR CARPI RADIALIS TENDONS SLUNG BENEATH THE NAVICULAR. ACTING IN CONJUNCTION WITH THE TRANSVERSE CARPAL LIGAMENT THEY FORM A MUSCULO-APONEUROTIC HAMMOCK FAVORING BETTER APPOSITION OF FRAGMENTS
b

Additional evidence in favor of this position is offered by structures present on the volar

aspect of the wrist[2]. Slung in a hammock of tense aponeurotic fascia, namely, the transverse carpal ligament, we encounter the tendon of the flexor carpi radialis coursing in the groove of the greater multangular to its insertion at the base of the second metacarpal bone, also gaining the under surface of the navicular (Scaphoid) bone. In addition the tendon of the flexor pollicis longus as it proceeds distally between the superficial head of the flexor pollicis brevis and the oblique portion of the adductor pollicis to its insertion at the base of the terminal phalanx of the thumb reinforces the action of the flexor carpi radialis tendon. That is, both of these tendons are rendered tense and are so disposed on the volar aspect of the navicular with the hand in extension as to conveniently act as a sling for this bone and favor better approximation of broken fragments. This was easily and quite convincingly demonstrated


LIGAMENTOUS SLIP
LIGAMENTOUS SLIP DERIVED FROM DORSAL CARPAL LIGAMENT ATTACHED TO DORSUM OF NAVICULAR PROXIMAL TO LINE OF FRACTURE — SHOWING HOW IT INCREASES GAP BETWEEN BROKEN FRAGMENTS WITH HAND IN FLEXION
(SCHEMATIC)

The position of the fragments is further enhanced by deviating the extended hand to the radial side. Ulnar adduction interfered with good apposition of fragments; for the radial collateral ligament, springing from the radial styloid to the tubercle on the distal volar aspect of the navicular, is rendered taut with the hand in this position and tends to pull the two frag-

ments apart. It was also observed that the interosseous ligament passing from the nonarticular portion of the lunate to the navicular is placed under tension with the hand flexed, pulls on the medial border of the navicular, and angulates rather than approximates the two fragments.

An objection to the use of extension was cited by Adams and Leonard[5] in a recent article in the NEW ENGLAND JOURNAL OF MEDICINE on the grounds that it was observed in a case operated on for an old fracture that the dorsal carpal ligament was dipping into the fracture and thus likely interfering with good approximation and healing. This tendency was not observed by us and furthermore it would seem that in the case of a recent fracture the probable maximum amount of separation would not be great enough to permit of the insinuation of a double thickness of the carpal ligament, for an infolding or dipping in of the ligament actually amounts to this.

In the light of R. W. Johnson's[4] recent excellent animal experimental work on bone repair in scaphoid fractures showing that with close approximation of fragments one obtains satisfactory solid osteoid union similar to the bone repair evident in the medulla of the diaphysis of long bones—though less active and not so extensive—it seemed to us highly desirable to establish definitely which position of the hand yielded the best surface to surface contact.

SUMMARY

1. The dissections of sixty wrists disclosed that the major portion of the ligamentous structure springing from the dorsal carpal ligament gains insertion on the proximal two-thirds of the dorsal surface of the navicular (O. T. Scaphoid) bone. Since the dorsal carpal ligament is placed under tension with the hand in flexion, the navicular ligamentous slip, springing from it, is likewise rendered taut and pulls the proximal fragment away from the distal one.

2. The approximation of the broken fragments is distinctly favored by the tendons of the flexor carpi radialis and the flexor pollicis longus. They act together as a sling to the navicular bone on its volar surface when the hand is placed in extension.

3. The small lateral interosseous ligament in the proximal row of the carpal bones is placed under tension when the hand is flexed to either side and in a minor degree displaces the fragments by tending to produce lateral angulation.

4. The radial collateral ligament stretching from the radial styloid to the tubercle of the navicular, by the nature of its attachment, favors better alignment of fragments when the hand is extended to the radial side.

5. The position of choice in the treatment of carpal navicular fractures is about 45° extension of the wrist with radial deviation, avoiding extreme or forced extension.

I am gratefully indebted to Dr. F. J. Cotton for initiating this investigation and for his unstinted co-öperation. I am also grateful to Dr. Joseph Burnett for his collaboration in the early part of this work.

Many thanks are extended to Professor F. W. Thyng—head of the Department of Anatomy—for the privilege of carrying out this investigation and likewise to Professors Spector and Sykes for the many courtesies accorded me in the Laboratory.

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CREEPING ERUPTION (LARVA MIGRANS)

Report of Case

BY JACOB L. GRUND, M.D.*

THE dermatologic entity designated "creeping eruption" is seen with sufficient rarity in New England to warrant the report of a case. Its most common habitat is Russia, although it has been not uncommonly encountered in the Shetlands Islands and in Norway. Locally, there has appeared no report in the literature of its occurrence. However, many cases have been seen and much original work has been carried out in the southeastern states, where the disease is found in its most classical and severe form[1, 2]. The characteristics that usually attend the course of a case of creeping eruption are extremely interesting and singular, and if unrecognized may become sufficiently extensive to place the patient in a state in which therapeutic ingenuity is required.

*For record and address of author see "This Week's Issue," page 597.

CASE REPORT

B. M., white, a salesman of 31 years, complained of marked itching of the left sole. This had been present 15 days. On questioning, he stated that at the beginning of the period, while sojourning at a Florida beach, he thought that he experienced a sudden stinging sensation in his affected foot, comparable to the sharp sting of a mosquito. He paid no further attention to the incident. However, two days later, the dorsum of his left foot began to itch. He saw for the first time a raised erythematovesicular lesion of the shape of a piece of string, extending from the medial surface of the proximal portion of the large left toe onto the dorsum of the

foot adjacent to the toes, for a distance of about one inch. The lesion gradually pursued a tortuous linear course until it traversed the entire dorsum of the foot. The itching was constant and intense despite the almost constant application of various lotions and salves. Figure 1 demonstrates the appearance of

FIG. 1. Tortuous pigmented line indicating inactive and healed lesion of creeping eruption.

the spent remains of the eruption. The vesicular stage of the eruption on the dorsum of the foot had disappeared and a tortuous pigmented line, indicating that in that location, at least, activity was no longer present, is seen in the illustration.

Figure 2 shows the appearance of the eruption on the sole at the time when the writer first observed the patient. The disease was active and was characterized by the presence of a tortuous, thick-roofed, erythemato-vesicular, whipcord-like lesion, which was markedly itchy.

In the treatment, concentrated nitric acid was applied at the advancing end of the lesion, but this did not prevent the onward course of the parasite. The application of tincture of iodine and then of ethyl chloride was also of no avail. Recourse was then had to carbon dioxide snow. A pencil made of this was applied with slight pressure for 15 seconds at the advancing point of the eruption. Letter "a" in figure 3 is just above the bulla produced by the snow. As a rule, treatment carried out in this manner, suffices to stop the further course of the disease in a case of this extent. But a curious phenomenon occurred. The carbon dioxide snow evidently prevented the further travel forward of the parasite. The nematode, however, travelled backward for a distance of about 2 inches over the exact course that it had previously pursued. The inactive, flat, pigmented lesion again became raised and vesicular. A second application of carbon dioxide snow was necessary just beyond the new course taken by the parasite. Letter "b" in figure 3 is just above a fresh bulla full of serum produced by the snow. The parasite was apparently exterminated by the last treatment, for after the subsidence of the active portion of the eruption mentioned above, the patient made a rapid recovery. The pruritis disappeared and no new skin lesions were apparent.

Attempts, at various times, to determine the presence of the offending parasite and to extricate it were fruitless.

LITERATURE

Creeping eruption was first described in 1874 by Lee[3]. A second case[4] was reported by the same author after a lapse of 10 years. In 1892, Crocker reported a third case[5] from England and in addition mentioned the fact that the disease occurs in Arabia. Isolated cases have since been described from various parts of Europe, Asia and Africa.

In the United States, the first cases described were by Van Harlingen[6] in 1902. Another was reported in 1903 by Stelwagon[7]. Further in-

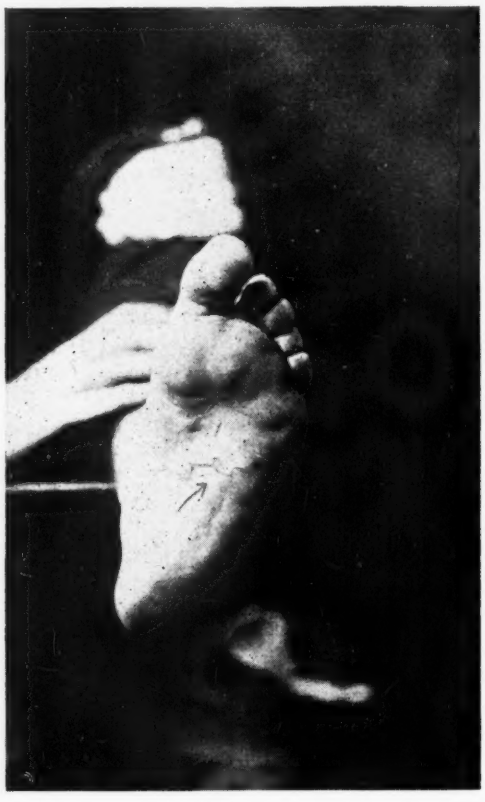

FIG. 2. Raised erythemato-vesicular whipcord-like lesion of creeping eruption.

stances of the disease have been presented by Hamburger[8], Shelmire[9], Hutchins[10], Moorhead[11], Gosman[12], Haase[13], Kirby-Smith[14], Knowles[15], Gaskill[16], Whitehouse[17], Fox[18] and Klauder and Greenbaum[19]. Although a case has been seen in Nebraska[20], almost all have been from the eastern and southern coasts.

SIGNS AND SYMPTOMS

The disease is characterized by the presence of a linear, tortuous eruption, which is caused by the migration of the parasite within the skin. The burrows produced may become vesicular and give the appearance of an elevated, more or less continuous vesicular line. Bullae and secondary pus infections may form. Following penetration of the skin, the parasite remains at the point of entry, resulting in the formation of a reddish, sensitive papule. Within two to four days the advancing, raised thread-like burrow may be observed.

FIG. 3. Healing lesions with bullae produced by carbon dioxide snow.

The parasite advances most rapidly at night, traversing from a fraction of an inch to several inches in twenty-four hours. This migration may continue for weeks or months. Crocker's exceptional case was of several years' duration. The burrows may become sufficiently extensive to cover the entire body. The itching present may assume so intensive and constant a character that the affected subject's sleep and appetite, and consequent weight and vitality are profoundly disturbed.

ETIOLOGY

Opinions regarding the etiology of creeping eruption have varied. It is at present recognized that the causal parasite, which has been found in only relatively few of the cases, is not in every instance the same. A Gastrophilus larva, transmitted by the fly, has been definitely demonstrated in some of the European cases[21].

A Gnathostoma parasite is believed by Tamura[22, 23] to be the etiologic factor in cases of creeping eruption occurring in Siam, the Malay states, China and Japan.

A third and entirely different nematode has been presented by Kirby-Smith, Dove and White[2] as the offending parasite in cases of creeping eruption encountered in the United States. The above workers have amply demon-

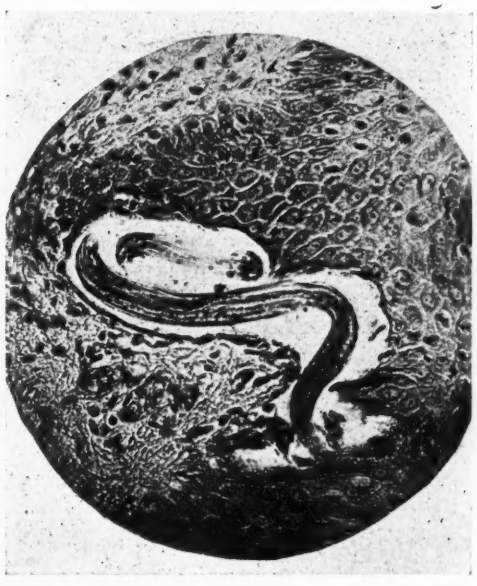

FIG. 5. Photomicrograph of creeping eruption nematode in burrow; ×480. (After Kirby-Smith, Dove and White.)

FIG. 4. Multiple lesions on limbs showing impetiginous condition from frequent scratching. (After Kirby-Smith, Dove and White.)

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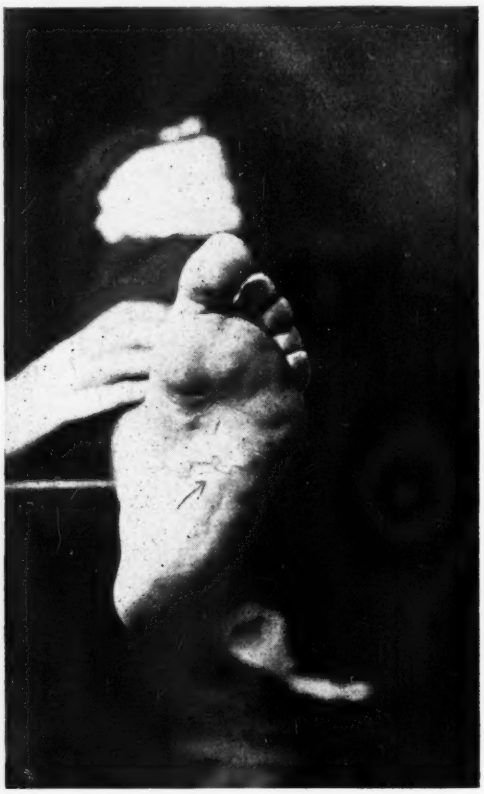

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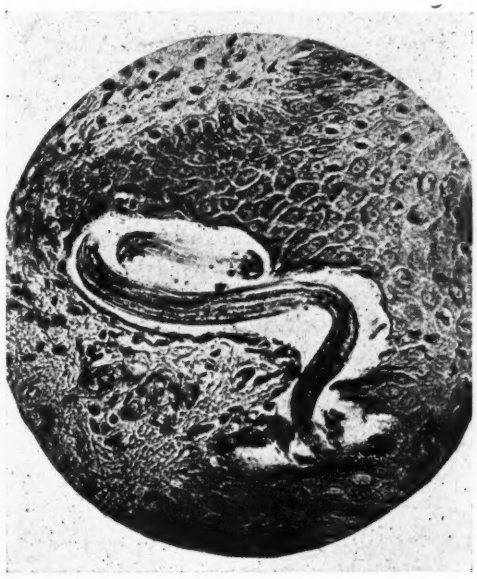

FIG. 5. Photomicrograph of creeping eruption nematode in burrow; ×480. (After Kirby-Smith, Dove and White.)

FIG. 4. Multiple lesions on limbs showing impetiginous condition from frequent scratching. (After Kirby-Smith, Dove and White.)

strated that the etiologic agent is a nematode larva, approximately 1/200th of an inch in breadth and 1/50th of an inch in length and named by them *Agamonematodum migrans.* Figure 5 is of a photomicrograph of the organism. It is thought that the parasite is present in soft, damp sand. Observations of Kirby-Smith et al indicate that the creeping eruption nematode is, in all probability, a normal parasite of some warm-blooded animal, possibly the rat.

TREATMENT

In the treatment, it is essential that the onward course of the parasite be blocked. If this is accomplished, the activity of the lesions ceases, the vesicular and erythematous aspects of the eruption pigment, and all evidences of the disease should disappear with time. Refrigeration by means of ethyl chloride or carbon dioxide snow, applied at the advancing end of the eruption, is, as a rule, sufficient to accomplish the desired results. However, with non-recognition of the disease and the consequent secondary infection (Fig. 4) resulting from the patient's attempt to allay the marked itching by frequent scratching, further measures, usually of value in impetiginous or staphyloccocus infections, will of necessity be employed.

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A NEW EVENING SPEECH CLINIC

The Endowment Fund Committee of the Boston Stammerers' Institute Alumni Association has just announced that a new evening speech clinic for stammerers will be held at the Institute, 419 Boylston Street, Boston, on Tuesday evenings, beginning October 8.

Special consideration will be given to patients referred by their family physicians, and it is suggested that as many as possible of such patients call on Tuesday evening, September 24, or October 1, before this clinic is announced to the public, and talk with Director Robbins.

This clinic is open only to those who cannot afford to pay the regular fees charged by the Institute for individual conferences. All fees will be waived in the case of about 10% of the applicants who most need aid; others will be charged a nominal fee while seen individually, in proportion to what they have to spend on things other than necessities.

Persons who have speech defects other than stammering or stuttering need so few lessons when they apply themselves conscientiously to speech training that the present rates for twenty-minute lessons bring speech training within their means; therefore the clinic has been restricted to stammerers who have attained their seventeenth birthday (other clinics are available elsewhere for children).

In order not to interrupt conferences held at other times with private patients, persons are requested not to call or telephone about this clinic outside of clinic evenings. A similar clinic will be held on Wednesday evenings if too many apply to be taken care of on Tuesday evenings. Individual instruction will be given until members of the clinic have learned how to speak normally, when they will be seen in groups, without charge.

SLIMNESS OF BODY A POSSIBLE DANGER

The prevailing fad of extreme slimness among young women may, according to Dr. Wynn, Health Commissioner of New York, promote the increase of tuberculosis in this class in coming years.

This seems reasonable because good nutrition plus hygienic habits and surroundings promote resistance to disease.

It will be an indictment of the race if disease increases and virility declines in the future. The march of the added years of life should not be impeded by any foolish standards of physical appearance.

The race needs strong well-developed mothers in order to add to the power of nations.

MASSACHUSETTS MEDICO-LEGAL SOCIETY

CARBON MONOXIDE POISONING*

BY DAVID C. DOW, M.D.†

MAY I briefly recount certain illustrative examples of the power of this poison?

1) A student at Harvard on the eve of examinations sought the quiet of his garage to prepare. There was practically no ventilation. He got into the auto, brought the light into position over his shoulder and—presumably for warmth—started the engine. Nine hours later the body was turned over to the medical examiner showing the typical discoloration of CO poisoning.

2) A Greek 30 yrs. of age had a small gas heater in his bedroom which he had been warned not to use without opening a window. He retired at 11 P. M. At 7 A. M. the landlady heard him go to the bath room. At 8 A. M. she went to call him; as she opened the door she felt a blast of hot atmosphere—went in and stumbled over the roomer's body. Examination of the body found typical appearance of CO poisoning.

3) About 3 P. M., Jan. 1st, I received a call from the Belmont police to go to the Waverley section where we arrived at 3:30 and entered an apartment where there were five bodies, three on the floor of the living room, one on the threshold of the bedroom door, sitting with back supported by door frame, and one, a woman, on the bed. The apartment was a one story ell of a larger house having but four rooms, the largest a living room 20′ x 13.3′ with furniture and having seven windows; from this a bedroom, 10′ x 9′ opened by a single doorway. There were also a bath room and a tiny kitchenette, the latter containing a three burner gas stove and a Ruud water heater, leaving barely room for two persons to stand. The entire air space was less than 3000 cu. ft. There were twelve large windows in all but none were open. A small gas heater (radiant type) was near the door and was burning when the police entered. There were also two steam radiators. In addition to the five dead, two children were found and as they were still breathing, had been removed to a hospital. There were also three dogs, which though overcome, survived.

The apartment had been unoccupied for some time but a man and wife had rented it and moved in the day before (Saturday, Dec. 31st). A brother and his family came to help them get settled. On Sunday, the day of the tragedy, as the visitors did not return to their own home when expected, other members of the family went to find them, discovered the situation, and found the landlord who opened the apartment. All the adults were dead, all but one were pink, the children were living but died 24 hrs. later; the dogs, as mentioned, survived.

The night policeman reported that at 4 A. M. he had heard a whining noise as he passed. There was a Ford sedan parked in front of the house and he also heard a woman groaning. He tried to peek in under the curtains and a dog barked. The officer concluded that a woman was in labor so did not investigate further, but heard the dog again at 5:30.

The tenant was a man of good reputation. There was no evidence of liquor anywhere. The dining room table was set for five people with a "Dutch supper". Tea was poured and some of the salad had been eaten. A teapot was on the stove in the kitchenette. There was no frying pan or other utensil for preparing the salad. Why did the adults die before the children and why did the dogs survive?

The Arlington Gas Co. computed the gas consumed as 500 cu. ft.

It is unusual for even Medical Examiners to come into cases of carbon monoxide poisoning in such wholesale lots, but this instance shows the danger of whole families being wiped out by a poison which is odorless, which is non-irritant, and which—according to Haldane—can saturate the blood up to thirty per cent. before symptoms become manifest.

Carbon monoxide poisoning is on the increase because of the growing use of illuminating gas for cooking and heating purposes, and the substitution of water-gas for coal-gas, and the added use of the gasoline engine. In New York City alone there are over four hundred such deaths a year, either accidental, or with intent, and it is claimed that as an industrial poison, carbon monoxide has superseded lead.

The so-called water-gas, containing as it does about thirty per cent. carbon monoxide, as against six to eight per cent. in coal-gas, renders it a much more potent poison, and is—somewhat at least—responsible for the great increase of the number of victims. If the people want cheap gas, their demands can be satisfied, and Henderson well says: "That there is a direct causal relation between over-capitalization, a large proportion of water-gas, and a high death rate".

The toxic action of illuminating gas has been carefully studied by Haldane, Sellman, Edsall, and Lenhart, and their studies show that the

*Read before the Massachusetts Medico-Legal Society, June 8, 1926.

†For record and address of author see "This Week's Issue," page 597.

poisonous principle in this gas is carbon monoxide. And the other substances in the gas, used to increase its luminosity, are non-toxic. These investigators claim further that the deleterious effects of carbon monoxide are due solely to its ability to combine with hemoglobin of the blood in the same manner that oxygen does, volume for volume. Only carbon monoxide has an affinity for the hemoglobin, four hundred times greater than has oxygen, according to Haldane, and three hundred times greater, according to McComb. And its poisonous effects are due wholly to the resulting decrease in the oxygen-carrying power of the blood. While carbon monoxide has a great affinity for hemoglobin, the compound formed between the two is not permanent; it is relatively unstable, and produces no lasting deterioration in the oxygen-carrying power of the hemoglobin. This very instability may account for its rapid dissociation when the victim of its assault is brought into the fresh air.

In the Physiological Laboratory at Oxford, Haldane has shown that the symptoms caused by carbon monoxide depend upon the extent to which the hemoglobin has been saturated; that carbon monoxide is cumulative in its action; that when air containing carbon monoxide is breathed, about one-half of it is absorbed, and the time required to produce the symptoms in an adult depends upon the time required for the inhalation of 660 cc, or the absorption of 330 cc. He has also shown that the time required for symptoms to appear or disappear in different animals, is proportional to the respiratory exchange per unit of body weight. The respiratory rate being greater in animals and children, they are therefore overcome with greater rapidity. The poisonous action of carbon monoxide rapidly increases when the oxygen per cent. in the air breathed is abnormally low. In other words, vitiated air hastens the rapidity of carbon monoxide poisoning.

Of the irrespirable gases, carbon monoxide is not only exceedingly dangerous, but carbon monoxide poisoning is most common and is responsible for more deaths than all other gases. Beside being a constituent of illuminating gas, and being expelled in large quantities from the automobile exhaust, it is a product of incomplete combustion of carbonaceous matter, and is chiefly responsible for the poisonous effects of smoke in burning buildings, (suffocation) of fumes around furnaces, from explosions, and is a constituent of after-damp in mines. The automobile will generate two cubic feet of gas per car per minute, and a Ford car will generate enough gas to kill in five minutes if the engine is allowed to run in a small garage without ventilation. This rapid formation of carbon monoxide gas from the automobile exhaust readily accounts for the great increase in the number of deaths which we find in those who run their engines in closed garages.

The symptoms of carbon monoxide poisoning vary according to the dosage. The poisoning may be acute or may be chronic. If acute, the patient may be rendered unconscious without premonitory symptoms, or there may be an indifferent feeling of illness, accompanied by a throbbing of the vessels, headache, vertigo, and marked muscular weakness. Vomiting often occurs, and if the dose is larger, the symptoms become rapidly severe, with drowsiness, loss of consciousness, and loss of sphincter control. Muscular twitchings are common, and convulsions may occur. Commonly, these patients are not seen until they are unconscious, and then we find heavy and rapid breathing, a full and rapid pulse, and the skin is more or less cyanotic; the cyanosis may be obscured however by the peculiar and characteristic cherry red color.

If recovery takes place, the awakening is gradual, and the patient has a peculiar mental haziness for some hours or even days.

The sequelae are common and interesting. Fever may supervene and last for variable periods—for a day to several weeks—particularly if there are pulmonary complications, such as broncho-pneumonia. In acute cases where the dosage has been large, cardiac weakness may supervene, and last for indefinite periods. But the most important sequelae are referable to the nervous system. There may be neuritis, neuralgias, tremors, stuttering speech, or paralysis and anaesthesias. Ocular symptoms while not common may occur, and partial or complete blindness may supervene for variable periods. Headache may be annoying, persistent, and severe. The gravest nervous sequelae are those due to cerebral changes, either diffuse or localized, and manifest themselves as paralysis or mental disturbances. These cerebral changes are prone to manifest themselves long after the acute symptoms have passed, and it should not be forgotten that mild poisoning may be the forerunner of important and grave sequelae.

The post-mortem signs are rather characteristic, and consist of redness of the face, with cherry red mottling of neck, trunk, and thighs: Cherry red color of the blood and many of the organs due to carbon monoxide hemoglobin. The vessels of the brain are engorged, and H. S. Forbes, of Yale, claims there is a cerebral oedema.

The treatment of carbon monoxide poisoning resolves itself into prevention as well as cure. A campaign of education instituted for the enlightenment of the public in general, beside those who, from the nature of their occupation are familiar with the unseen dangers, and the thorough instruction in methods of resuscitation of emergency workers, including house officers in our hospitals, ambulance crews, police, and firemen. Such a campaign could prevent many casualities from a poison easily prevented, but in the last decade has become more serious than many of the communicable diseases.

The standard treatment in cases of carbon monoxide poisoning has been fresh air and oxy-

gen when available, warmth applied to the body, and cardiac and respiratory stimulants. But Henderson points out that oxygen or air enriched with oxygen may be a respiratory depressant. Furthermore he observes that nature uses carbon dioxide to stimulate respiration, and on these principle, his method of treatment with oxygen and carbon dioxide depends. It is claimed for this treatment that mild cases of poisoning are rapidly restored. In more severe cases, even with deep coma, patients are restored quicker than with other treatment, and in those cases where respiration has ceased, it is practical to administer the oxygen—carbon dioxide mixture with the Schäfer prone pressure method of artificial respiration.

I fully realize that I have brought nothing new to the members of this Society, and I think very likely that you have handled more cases of carbon monoxide poisoning than the speaker, but if I have refreshed memories, and discharged an obligation to the Society, my efforts are not in vain.

A bulletin prepared and circulated by the Arlington Gas Company, recounts the accident and advises users of commercial gas and appliances of the dangers and how to avoid them. I heartily commend the Company for its efforts to educate the public.

Discussion

Dr. Colt characterized the paper as a valuable contribution and invited discussion. In answer to a question from Dr. Foster as to the relative lightness of CO and air, Dr. Dow replied that the former had a sp. gr. of 0.927. Dr. Foster suggested that it possibly explained why the children were less affected than the adults. Dr. Schneider questioned whether the first case was really one of accident.

Dr. Jones recounted a case—a policeman who used a Holyoke heater which he started Saturday evening. He did not report for duty next day and was found in his bath room, on seat, dead. He had not connected his heater to the flue and the fumes from this incomplete combustion against coils came into the rooms.

Dr. Magrath. Investigations are being made to learn if the heat generated by the radiant type of heater would cause more monoxide to be given off. The gas companies claim the opposite—that the radiants complete the combustion. He recited a case in which the red discoloration did not appear *until after the autopsy.*

Dr. Balmer of Whitinsville cited a case of a mill hand who was about to take a bath in a rather small room. An odor of gas had been noted. It was found that a gas main had burst and discharged into the sewer. There was no trap in the bath tub outlet and the gas poured into the bath room through the drain pipe.

Dr. Magrath related the following interesting case. "On March 23, 1924, a boy followed a dog into the cellar of a supposedly unoccupied cottage at Winthrop. The boy smelled gas and reported the fact to the fire department. Men came and found the body of the owner of the house in a closed room with a four flue burner, unlighted, discharging gas. The meter reader had been unable to get in since Nov. 1 and the owner was supposedly away. Observations on the amount of gas which had flowed showed that 47700 cu. ft. had been discharged into the room,—computing the elapsed time by the rate of flow, established the time of the accident. Dr. Boos made a determination of the CO content of the solid organs after five months."

Dr. Boos. The liver was most interesting, although dry on the surface; on section it was grey-brown at periphery but in the center was cherry red. This portion extracted, showed the presence of CO hemoglobin.

Dr. Hunt raised the question of the amount of CO that must be in the blood before the spectrum of CO hemoglobin would be obtained.

Dr. Boos. "Spectrum is not visible if less than 25% of the hemoglobin has been converted. Poisoning is not fatal until 75% has been converted. The finding of CO hemoglobin means only that the victim has inhaled carbon monoxide but it does not prove that death was from that cause. It is necessary to quantitate and if it is found that 75% or over has been converted to CO hemoglobin it is proof that death was due to CO.

SALEM ASSOCIATION FOR THE PREVENTION OF TUBERCULOSIS

The greatest gain in weight at the Health Camp at Salem Willows this year was 12 pounds in 7½ weeks, which is quite a record for the Association, according to Miss Edith J. Barker, Instructive Nurse of the Salem Association for the Prevention of Tuberculosis. The average gain was 4½ pounds for the children who stayed full time at the Camp and 3 pounds for the children who had to return home at night. These figures clearly indicate the need of increasing the facilities at the camp so that every child may receive the full benefit of this health-building program.

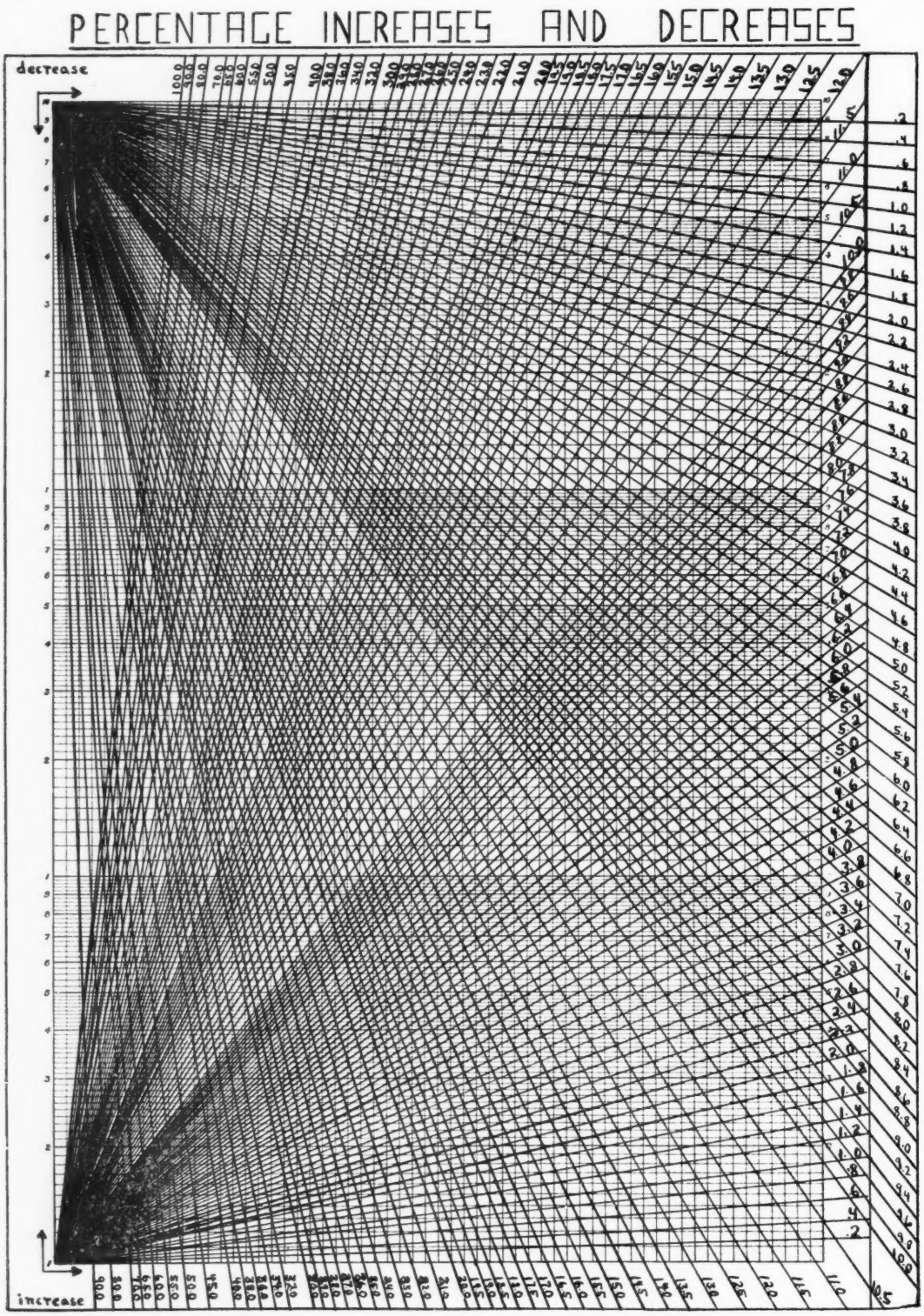
The usual careful follow-up work of the Association will be conducted this year so that these children will not lose any of the weight they have gained during the summer. The Posture Classes will be resumed on Saturday, October 5. Miss Bertha Schneider will be the Physical Director and many of the children who have been at the camp will be enrolled.

The Salem Health Camp has rendered a valuable service to the community this year in the prevention of disease and the promotion of health, and has shown that the most effectual program in the solution of the tuberculosis problem must begin in the earlier and more promising period of childhood.

A CHART TO ESTIMATE PERCENTAGE CHANGE*

BY FILIP C. FORSBECK, M.D.†

WITH any series of figures it is frequently desired to express a trend as an average percentage increase or decrease per unit of time, for example. Such a trend may be accurately determined mathematically, or, for ordinary purposes a smooth line may be "fitted" which repre-



*From the Massachusetts Department of Public Health.

†For record and address of author see "This Week's Issue," page 597.

sents the general trend. If the percentage change is reasonably constant, the general trend will be represented by a straight or nearly straight line on semi-logarithmic paper. Ordinarily the percentage rate of change is determined by selecting an early and a late point of the line, counting the years (for example), elapsed, and by the use of logarithms determining the rate of change. This procedure involves some trouble. The chart described eliminates the necessity for this calculation.

The lines representing percentage increase diverge from the lower left hand corner of the chart, those representing percentage decrease from the upper left hand corner. While the lines can be more conveniently used if on glass or other transparent material, ordinary semi-logarithmic chart paper will do. To use the chart, superimpose the trend line graph so that the left end of the trend line coincides with the origin of the ascending or descending lines, depending upon whether the trend is up or down. If use is made of interpolation the error of the estimate is negligible for ordinary purposes. Needless to say, the trend line which is to be calculated as to percentage change must be on logarithmic paper to exactly the same scale. Each division of the horizontal scale must be used once and only once. The chart and the sheet on which the trend is plotted must be held parallel when the reading is made. Instead of superimposing the trend sheet on the chart sheet, the calculation may be made by using a protractor.

A chart similar to the one described is illustrated in Whipple's "Vital Statistics", p. 211, Second Edition. Only increases are shown, and, because of its size, the chart is applicable only to some of the diagrams in the book. The chart described is designed to be of practical use for ordinary statistical work.

Copies of the chart described made on transparent material for use with three cycle semi-logarithmic paper may be secured from the Educational Exhibition Co., of Providence, R. I.

SUGGESTIONS RELATING TO SANITARY CONDITIONS IN SCHOOL BUILDINGS

The unit of a school building is the classroom. Whether there be one room or twenty in a school, the requirements are the same. The classroom is the school home of the child. The ideal school room is thirty-two feet long and twenty-three feet wide to provide comfortable room for about 30 children. A width of more than 23 feet is not desirable, because the row of seats farthest from the window will not receive proper illumination.

The illumination is of great importance. Long-continued study of natural lighting has shown certain definite fundamental requirements. These are as follows: The windows should extend as near the ceiling as possible and the ceiling should never be under 12 feet high. Unilateral lighting is considered to be the best system. This means that the windows should be on only side of the room so that the light will come from the left, and these windows should extend as far back towards the rear wall as possible. Every child should be able to see some sky when seated at his desk. The area of glass in the windows should equal at least 20 per cent. of the floor space. Shades should be provided for each window, two to each window being preferable, the two shades being placed at the middle of the window so that one pulls up and the other down. It should always be remembered that the best light enters through the upper third of the window.

To provide the best light and to avoid all glare is the ideal plan. The walls of the room should, therefore, be covered with a flat paint. A light buff or cream is desirable. The ceiling should be flat white. Blackboard should be limited to the front of the room and right side. The rear of the room should be free from blackboards, and blackboards should never be placed between windows. As a matter of fact, if enough window space is provided, there will not be space enough between the windows for blackboards. It may be interesting to know that some of the most recent school buildings still have serious defects.

The classroom furniture is a very important feature of school hygiene. The movable desk and seat is preferable as regards the cleaning of the floors, etc. The adjustable type is to be preferred. If this is too expensive, the 3 different sizes for each grade should be selected so that each child will have suitable postural facilities while studying.

The ventilation of the school room is very important for the health of the child. For many years engineers have worked to provide suitable mechanical means for ventilating school rooms. The present-day opinion has materially changed. The simple window ventilation with gravity exhaust is considered best for the ordinary classroom. Auditoriums and assembly halls need special mechanical devices, but the classroom does not need these. The window board ventilator for each window and an outlet on the opposite wall near the ceiling, or in the ceiling, which leads to a roof ventilator, is the most economical and healthful method available today. Of course each room should have a thermometer which should receive the careful attention of the teacher.

During the colder weather a room temperature of 68 to 70 degrees Fahrenheit is best.

Each classroom should have its own cloak room. For the older children, individual steel lockers are best. The cloak rooms should have heating facilities and outside illumination and ventilation. Where hooks are used, they should be at least 12 inches apart. This can always be provided in a cloak room.

The janitor service is important for cleanliness, heating and ventilation. Sweeping should always be done after school hours, and the vacuum system or the use of sweeping compound is necessary.

To sum up school hygiene, every effort should be made to provide school surroundings equivalent to those of a modern, well-conducted home.—*United States Public Health Service.*

Case Records of the Massachusetts General Hospital

ANTE-MORTEM AND POST-MORTEM RECORDS AS USED IN WEEKLY CLINICO-PATHOLOGICAL EXERCISES

EDITED BY R. C. CABOT, M.D.

F. M. PAINTER, A.B., ASSISTANT EDITOR

CASE 15381

DYSPNEA AND EDEMA

MEDICAL DEPARTMENT

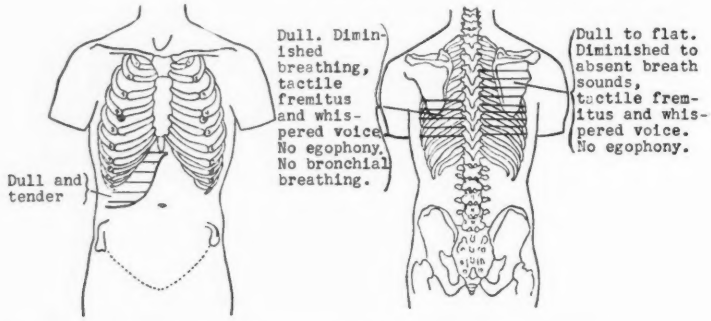
First admission. A married Canadian woman twenty-one years old entered December 19 complaining of dyspnea and orthopnea of three weeks' duration.

October 21, two months before admission, she was delivered by forceps. The child was normal. There were no postoperative complications. Immediately afterwards she began to be dyspneic on exertion. A month before admission her abdomen began to swell and to be painful in the right upper quadrant. Three weeks before admission she had orthopnea. She was taken to a hospital, where a pint and a half of light brown fluid was withdrawn from her right chest. She left the hospital still dyspneic and cyanotic. A few days later she had edema of the ankles for the first time. For three weeks she had had drenching sweats almost every night. She coughed only when she had attacks of asthma. In one of these attacks her sputum was blood tinged.

She had scarlet fever at seven. During the same year she was operated upon for appendicitis. At fifteen she had low abdominal pain and severe vomiting, and was operated upon for adhesions. She was then well until a year and a half before admission. Then she had an attack of asthma lasting from spring until December, and recurrent attacks of dyspnea. Skin tests showed her sensitive to ragweed only. Milk also brought on attacks of wheezing. After a week's treatment at a hospital she had no asthma for eight months. In August, four months before admission, she had a second attack, which still persisted.

The hospital where she had been treated reports that at her admission, one month before admission to the Massachusetts General Hospital, examination was negative except for scattered mixed râles over both fronts and axillae, firm diffuse enlargement of the thyroid and very rapid heart. Later a to-and-fro friction sound, systolic and diastolic, was heard over the tricuspid region, more intense on expiration. She had tenderness over the upper epigastrium and upper sternal region. 625 cubic centimeters of clear straw colored fluid was removed from the right back, specific gravity 1.016, cells mostly lymphocytes. After the tap the pain in the right side was relieved. At discharge the rub in the tricuspid area still persisted.

Clinical examination December 19 showed a poorly developed, thin, pale, cyanotic girl lying propped up in bed, very dyspneic and orthopneic. Slight enlargement of the thyroid, without thrill or bruit. Neck veins and veins over the sternum slightly distended. Lung signs as shown in the diagram. Apex impulse of the heart not seen or felt. Left border of dullness 10.5 centimeters from midsternum, 4.5 centimeters outside the midclavicular line, right border 3 centimeters, supracardiac dullness 7.5. Sounds distant. No murmurs. Paradoxical pulse, almost disappearing during inspiration. Blood pressure impossible to take; systolic about 100, diastolic about 80. An electrocardiogram showed sino-auricular tachycardia, rate 150, inverted T_1 and T_2, low voltage, a tendency to right axis deviation. Abdomen distended and tympanitic except far down in the flanks. Moderate edema of the legs. Rectal and vaginal examinations and reflexes not recorded. Pupils normal.


Dull. Diminished breathing, tactile fremitus and whispered voice. No egophony. No bronchial breathing.
Dull and tender
Dull to flat. Diminished to absent breath sounds, tactile fremitus and whispered voice. No egophony.

Urine: 30 to 66 ounces, specific gravity 1.010 to 1.032, no sugar, a very slight trace to the slightest possible trace of albumin at five of twelve examinations. Two catheter specimens showed 2 to 15 leukocytes per high power field. Urine culture, no growth. Blood: 25,000 to 12,100 leukocytes, 37 to 83 per cent polymorphonuclears; eosinophiles 21, 58, 5, 49, 9, 42 per cent; seven smears otherwise normal except for increased platelets in three later ones. Stools: much mucus at four of six examinations. Hinton negative.

Temperature 97.9° to 101.4°, with a period of

elevation December 29 to January 1 when it reached 102.8°. Pulse 93 to 142. Respirations 20 to 36.

X-ray examination showed over the lower two-thirds of the right lung a dense shadow obliterating the outline of the diaphragm and the right border of the heart and rising higher in the axillary than in the median line. The upper border was somewhat indistinct and mottled. The outline of the diaphragm was not well shown on the left. The apex of the heart was well out beyond the normal position. The right border of the heart was not visible. The right apex and the left lung showed no evidence of consolidation. There was no positive evidence of fluid in the pericardium.

A chest tap in the 9th right interspace about 12 cm. from the spine, done on the day of admission, gave 600 c.c. of cloudy amber fluid, specific gravity 1.017, 75,000 cells, no red cells, no tubercle bacilli or other bacteria seen; culture showed staphylococcus aureus, probably contamination.

December 20 the chest was full of musical râles and squeaks. There was still some fluid in both bases. A medical consultant found no appreciable amount of fluid in the pericardium. He thought the heart was displaced to the left and was probably working against a heavy physical handicap; that there was probably fluid in the left chest as well as the right; and that the picture was not due to the heart. He found the liver extremely painful though not pulsating. An asthma specialist thought it hard to tell how important the asthma was, and noted that he had never seen edema with asthma.

The asthma continued severe, although she was given atropin to the point of toxicity, besides frequent doses of morphia and adrenalin. Apprehensiveness and excitability aggravated her condition. The edema extended from the sacrum to the knees. January 1, after three days of elevated temperature, she developed a productive cough. The edema of the legs disappeared. With iodides her pulmonary secretions were greatly increased, and the sputum showed purulent material. Later the cough became harsh and there was dullness in the left axillary base and coarse sticky râles throughout both chests, more marked on the left. Aeration was very poor in both lungs. In many areas in the left lung no expiratory murmurs could be heard. The lower abdomen showed many dark red maculopapules, some with a slightly hemorrhagic center. The appearance was quite atypical for iodide rash. A skin consultant pronounced it purpuric, possibly due to poultices.

From January 3 she showed gradual improvement. By the 16th she could sleep flat in bed, the eosinophilia had receded and the cough had disappeared. Her worst complaint was abdominal pain, and that was less than it had been for a week. During the next week she complained chiefly of this, of pain over the precordia and pain in the lower back. She had several attacks of wheezing in which she developed musical râles throughout both chests. The eosinophilia increased again. At discharge, January 24, the liver was still several centimeters below the costal margin. There was slight shifting dullness in the flanks; no edema.

History of interval. The patient stayed in bed at home. Her general condition did not change. Diarrhea which began while she was in the hospital continued, five to seven movements every twenty-four hours. For five days she had menstruated for the first time since her delivery, and had felt something which she thought was her uterus protruding from her vagina. Her appetite was poor for the first two weeks at home, ravenous for the next two, then poor again for a week. Her urine was scanty and dark. Once she had burning micturition.

Second admission. March 8, six weeks after her discharge, she reëntered.

On clinical examination she was in great and audible expiratory distress. Skin moist. Both nostrils obstructed. Thyroid slightly swollen, soft. Loud musical expiratory râles filled the entire chest. Tactile fremitus not satisfactory, partly on account of dyspnea. Some dullness to percussion on both sides, more on the right. On the left an area of dullness running up the midaxillary line. No marked diminution of breath sounds anywhere. Apex impulse of heart felt 10 cm. from midsternum, 2.5 cm. outside the midclavicular line, right border of dullness 1.5, supracardiac dullness 4. Rhythm regular, rate rapid; apparently a third sound. A systolic and diastolic murmur at the base. Blood pressure 110/70 to 90/80. An electrocardiogram showed sino-auricular tachycardia, rate 110, rather low T waves, rather small complexes. Abdomen distended, especially on inspiration. Pelvic examination: reddening of the mucous membrane and swelling of the body of the urethra. Fundus of uterus not felt. Rectal examination negative. Fingers very slightly clubbed. Pupils: no reactions to light. Knee jerks and ankle jerks not obtained.

Urine: amount not recorded, specific gravity 1.022 to 1.030, a large trace to a slight trace of albumin at two of four examinations, leukocytes at all (no catheter specimen). Blood: 17,700 to 7,400 leukocytes, 49 to 70 per cent polymorphonuclears, 2 to 12 per cent lymphocytes, eosinophiles 45, 57, 14 per cent, hemoglobin 45 to 55 per cent, reds 3,050,000 to 3,025,000, slight anisocytosis in all of three smears, polychromatophilia in one, no achromia, platelets normal. Sputum mucoid or mucopurulent at both of two examinations; no tubercle bacilli. Stools: no gross or occult blood, no tubercle bacilli.

Temperature 98° to 100.4° until March 29; terminal, 104.4° to 99.1°. Pulse 70 to 120.

Respirations 33 at entrance, after March 11 normal.

X-ray examination showed very little change in the appearance of the chest since the last examination. The films were difficult to compare because of difference of position. The diaphragm appeared very high, irregular on the right side.

In the ward the patient gave an additional history of diarrhea for three months, of puffiness of the face, eyelids, hands and arms for several days two months before admission, and of muscular soreness for several weeks.

Examination March 13 showed fluid in the pleurae, both sides, possibly very slight ascites, no edema. Pelvic examination was negative but not entirely satisfactory. There was muscle tenderness everywhere. March 15 the visiting physician pointed out a to-and-fro sound, probably a friction rub, loudest over the tricuspid area. A chest tap in the 7th interspace in the posterior axillary line gave 1500 c.c. of cloudy straw colored fluid, specific gravity 1.020, 480 leukocytes, 64 per cent eosinophiles, 2 per cent polymorphonuclears, 28 per cent lymphocytes, 4 per cent large mononuclears, 2 per cent basophiles; no organisms. Culture, no growth. Guinea pig test negative.

March 16 biopsy was done from the gastrocnemius muscle. A week later the left thumb was painful, hot and swollen and the right breast swollen, tender and apparently caked. Three days later this had subsided. X-ray examination with a barium enema was negative except for ptosis of the colon. The patient now complained of severe constant precordial pain. There was a loud rough systolic sound in the fourth left interspace to the left of the sternum; no diastolic; no Broadbent or Ewart's signs. There were crepitant râles at both bases. The abdomen was distended and tympanitic, with a little dullness in the flanks. A blood culture was negative. April 1 the apex impulse of the heart was not felt. The supracardiac dullness was 9, the left border 12, the right border 3. The sounds were more distant. The friction rub was still present. The blood pressure was 90/80, very difficult to take. April 3 the apex impulse was palpable.

The morning of April 4 the patient's sclerae were icteric. In the afternoon she vomited, and when examined soon afterwards was irrational. The systolic blood pressure was 80. The apex impulse was still palpable, the heart sounds loud and of good quality. The abdomen was not tender; there was no spasm. The reflexes were lively. Four hours later the patient died.

Discussion

BY RICHARD C. CABOT, M.D.

NOTES ON THE HISTORY

From the opening sentence we are expecting a cardiac case.

I do not know why the fluid should be brown. It ought to be colorless.

Nights sweats of course we cannot account for by passive congestion. With drenching sweats she probably had fever and some infection.

Adhesions are a very uncertain thing to operate on. I have never known of an operation for adhesions that did not produce more adhesions, necessitating another operation which will cause more adhesions, and so on forever. I never knew of any successful operations for adhesions unless for a single large band that could be cut. Most operations for adhesions that I have known have been failures.

NOTES ON THE PHYSICAL EXAMINATION

The lung signs show fluid, presumably with a high diaphragm from congested liver, which is dull and tender.

The heart measurements seem to indicate that the heart is enlarged.

Paradoxical pulse is a sign often seen in pericarditis with effusion.

Right axis deviation means a large right side of the heart ordinarily.

That urine examination ought to mean normal kidneys.

Dr. Tracy B. Mallory: The higher eosinophile counts are more probably correct.

Dr. Cabot: Those are very high counts, especially as the total leucocyte count is not high. What are we to say about those eosinophiles?

A Physician: She may have had some asthma.

Dr. Cabot: We think of eosinophilia especially in relation to three things; animal parasites, asthma and chronic skin disease,—a very motley assortment. It is strange that eosinophilia is common to those three things. We have no reason in this case to suspect animal parasites or chronic skin disease and not much evidence of asthma; yet the counts seem extremely high.

A Physician: Can you connect it with the large tender liver?

Dr. Cabot: Eosinophilia has been reported in some cases of malignant disease of the liver. But I think we have no reason to think of that.

A Physician: What do increased platelets mean?

Dr. Cabot: Increased platelets signify nothing. Decreased platelets mean something.

Dr. Holmes: In the first two plates on December 19 the thing that strikes us first is the high position of the shadow of the diaphragm. That of course could be due to something, possibly fluid, in the belly. The lung field is unusually small on the right side. The angle between the chest wall and the diaphragm has disappeared and dullness extends along the axillary border, giving the characteristic appearance of fluid in the pleural space. The lung fields so far as seen show nothing unusual. There must be a good deal that we cannot see behind the

diaphragm and heart. The heart shadow is also obscured by the high position of the diaphragm. All that we can say is that the diaphragm is unusually high from some cause, probably something below the diaphragm, and that there is evidence of fluid in the pleural space.

DR. CABOT: For our present purposes I should say that the absence of any evidence of pericarditis is the most important thing Dr. Holmes has mentioned.

From the chest tap I should suppose that this was not a dropsical fluid. That is an unusually high gravity. It seems that there must be some infection.

Whether by "physical handicap" the consultant means asthma I do not know. I suppose he does.

Poor aeration is suggestive of bronchopneumonia at that time.

She has been taking iodide and they were wondering what caused the rash.

I think I will not ask what diagnosis they made at the end of her first stay in the hospital. I venture to guess that they were very much in the dark, as I am.

We expect musical expiratory râles in both chests in asthma of course. They probably could not get her to speak loud enough to bring out tactile fremitus.

There is nothing in the electrocardiogram that gives us any light on the case.

They are trying so many tests that I think you can infer a state of perplexity, which I hope is yours, because it certainly is mine.

DR. HOLMES: The second X-rays are taken I presume after tapping in an attempt to find out if possible what if anything was in the lungs underneath that fluid. They do not help very much. They do bring out a little more clearly that the diaphragm is actually a little high. The slight changes at the root of the lung are not more than would be expected in a compressed lung. We might interpret those as being enlarged bronchial or peribronchial glands.

DR. CABOT: That looks queer to me.

DR. HOLMES: These plates are not taken in the way you are accustomed to see them. They are portable X-rays. They were probably taken from the back with the tube close, so that everything is magnified. January 10 does not add anything. On March 2, second admission, all the conditions which we saw in the previous plates are present and magnified. The shortening of the lung spaces is distinctly more marked than in the previous plates. The aeration of the lower part of the lungs is very poor, whether because of consolidation or compression of the lungs one would not be able to say. The heart shadow is obscured and there is thickening of the interlobar septum. The plates are now more suggestive of inflammatory changes in the lungs than in the previous examinations. The examination of the gastro-intestinal tract was negative and I see nothing in the plates to suggest anything different.

DR. CABOT: The emergence of a history of puffiness of the face and muscular soreness shows that somebody has thought of trichiniasis. If you have a thing in your mind you can often get it out of the history. Of course we want still more to know if there is any history of her having eaten undercooked pork.

MISS PAINTER: They did ask for that history. She said that she seldom ate pork, but she was not sure that she had not eaten any. She was very indefinite about it.

DR. CABOT: We see edema of the face a good deal in trichiniasis, and also lung symptoms and signs. But I never knew of a death from trichiniasis, although I have seen some post mortem diagnoses of trichinous disease in patients who died from something else. Do they ever die of trichiniasis, Dr. Mallory?

DR. MALLORY: Yes, I know of fatal cases. There was an epidemic a few years ago of about a dozen cases in Boston, in which two died.

DR. CABOT: If they were going to die I should think they would die from some pulmonary or diaphragmatic infection. This case would make you think of something wrong with the diaphragm.

They find a great deal more muscular tenderness since they began to think of trichiniasis.

Ptosis of the colon I should call normal. Do you?

DR. HOLMES: Yes.

DR. CABOT: The gravity of the pleural fluid is too high for a dropsical fluid.

Of course this supracardiac dullness is by percussion, not by X-ray. A supracardiac dullness of 9 is enormous if true.

DIFFERENTIAL DIAGNOSIS

I am sure I have never seen a case like this before. That is the interest of the practice of medicine.

(1) When we started off we had our minds a good deal on asthma. Can a person die of asthma? Yes, he can. We have had an autopsy here. I should not think, however, so far as I can get this history, that she had enough asthma to cause death. I do not know exactly how asthma produces death. I suppose it is by wearing out the heart in its exertions against a congested lung. Is that your idea, Dr. Mallory?

DR. MALLORY: I think it is partly right heart failure and partly asphyxia from the complete arrest of the respiratory exchange of air due to blockage of the bronchioles.

DR. CABOT: Certainly the picture as it is described here is not the picture of a patient dying of respiratory distress.

(2) It looks, then, like a heart case when you get away from the idea of asthma. What kind of heart disease can it be? Certainly there is nothing suggesting valvular disease except at

one time a diastolic murmur. They did not mention that murmur at the end. There is no hypertension, no suggestion of syphilis.

(3) They did their best to investigate bacterial endocarditis. I do not know that it can be excluded, but certainly it is not at all the typical picture of that infection. There was a certain amount of leukocytosis at times and fever at times. She has had no friction rub, no positive blood culture and not the kind of heart sounds you would expect. I do not believe it is bacterial endocarditis, although I cannot absolutely exclude it.

(4) There is a rapid pulse. Can we say the heart gave out because of hyperthyroidism? I do not think we can. There are but two signs here, thyroid enlargement and rapid pulse. The pulse was not steadily rapid or extremely rapid and she had none of the other signs of hyperthyroidism.

(5) Can we say this is emphysema heart? I think not. So far as I know, the diagnosis of emphysema can be made only with X-ray. Possibly the emphysema may have been covered up by congestion so that we could not see it.

DR. HOLMES: The plates are very much against emphysema or asthma. In emphysema we usually have a low diaphragm.

DR. CABOT: There is passive congestion from some cause, perhaps from cardiac failure, yet not any type of cardiac failure that I can name. The history certainly was not taken so as to bring it out.

(6) I am not at all accustomed to see such high counts of eosinophiles in asthma, but I have seen them again and again in trichiniasis. With this history clearly taken with that in mind, there is a good deal to suggest it. Edema of the face, muscular tenderness, lung signs and symptoms which are certainly important in some cases of trinchiniasis,—all that goes with that disease perfectly well. There was a biopsy on the muscle and I will inquire about that in a minute; but first I want to commit myself as far as I can. I have never seen death from trichiniasis, and I have not followed the literature of what has been found in fatal cases. If I knew more about how patients die of trichiniasis I might be able to say more. I think I will put it this way; either she died of trichiniasis or I do not know what she died of. She had various complications such as pleurisy which I suppose would be perfectly consistent with trichinous infection. But she certainly did not die of that. She had pericardial friction, but she did not die of pericarditis. She had no large effusion such as can cause death.

(7) She had fixed pupils and absent knee jerks, but she did not die of those. If those mean anything, they mean tabes. I do not believe that she had tabes. If she did, it did not kill her. I cannot say anything more.

A PHYSICIAN: Could it be polyserositis?

DR. CABOT: That is not a very satisfactory diagnosis, I think. Polyserositis means of course not merely dropsy but inflammation in many of the serous membranes. I do not know of any one disease that that term connotes. If there is any such thing I do not know of it.

A PHYSICIAN: Doesn't this picture go pretty well with Pick's disease?—fluid in the pericardium, cirrhosis of the liver and ascites?

DR. CABOT: Pick's disease means chronic pericarditis with capsular cirrhosis. There is very little ascites here. The liver was enlarged, but not more than we expect it to be with passive congestion. I should not say we have much of a picture of Pick's disease, although I cannot exclude it.

A PHYSICIAN: Couldn't trichiniasis involve the brain and cause those pupils and knee jerks?

DR. CABOT: I should say not.

A PHYSICIAN: How do you account for the abdominal rash?

DR. CABOT: It might be produced by poultices, as suggested.

MISS PAINTER: It appeared just where the poultices had been.

A PHYSICIAN: Could she have had an echinococcus cyst of the liver?

DR. CABOT: I never saw anyone die of that alone. They will go along in fair health with huge cysts and obvious physical signs which are not present here.

A PHYSICIAN: She had also asthma, which will push the diaphragm down. Echinococcus cyst will push the diaphragm up.

DR. CABOT: Would you like to wager on it? I am pretty certain that this is not an echinococcus cyst.

A PHYSICIAN: Could it be a subdiaphragmatic abscess?

DR. CABOT: We generally try to identify some cause for subdiaphragmatic abscess before we make that diagnosis.

A PHYSICIAN: There might have been amebae to give the eosinophilia.

DR. CABOT: We have found very little in the way of intestinal symptoms. Had she always lived here?

MISS PAINTER: All her life.

A PHYSICIAN: How about a uterine condition?

DR. CABOT: I do not believe it. Let us try to think of uterine conditions that would cause death,—septic endometritis, pelvic abscess. I can see little evidence there. I will make a bet against pelvic disease as a cause of death.

A PHYSICIAN: How do you account for the painful liver?

DR. CABOT: I account for it chiefly by passive congestion and over-stretching the capsule.

My mind rests between two possibilities, (1) trichiniasis and (2) I don't know what. I prefer the second. But if I had to make a positive diagnosis on that case I should say trichiniasis. What about the biopsy of the muscle?

DR. MALLORY: That was negative.

DR. CABOT: I have nothing more to say.

A PHYSICIAN: What could there be that was crowding the diaphragm up?

DR. CABOT: Congested liver from poor circulation is in my mind. But what caused the poor circulation I do not know.

DR. MALLORY: I may add that I saw this patient in the ward thirty-six hours before death. She was sitting up making baskets. She did not seem acutely ill, had no marked asthma and was not at all jaundiced. At the time of death she was deeply jaundiced, so that occurred in the last thirty-six hours.

A PHYSICIAN: What produces a high diaphragm?

DR. HOLMES: High position of the diaphragm as we see it occurs either (1) from something below, like a large liver or fluid or masses in the abdomen, or (2) from something interfering with the respiratory movements of air in the lungs, blocking of the bronchi from any cause, or any condition preventing expansion of the lungs, or (3) injury to the nerve supply. Of course in this case it would have to be on both sides.

DR. CABOT: In my mind differential diagnosis means matching up a clinical picture with something I have seen before. So as this is something I have never seen before I have no confidence in my diagnosis.

A PHYSICIAN: Pick's disease?

DR. CABOT: We have very little ascites, never enough to tap. Apparently we have never found any good evidence of adherent pericardium, although it is true that that is a disease we can very seldom diagnose. What Dr. Mallory says makes the picture more difficult, she was so well, making baskets and so on, a very short time before her death. The only cases of Pick's disease that I have seen did not die suddenly.

A PHYSICIAN: Couldn't complications have set in and from that low blood pressure have developed a thrombus?

DR. CABOT: What did she have before the complications came? I do not want to diagnose complications of *X* until I know *X*. Is there any other diagnosis to suggest?

A PHYSICIAN: Mitral stenosis with dilatation of the right auricle and pressure on the bronchi.

DR. CABOT: I do not believe she died of that.

A PHYSICIAN: How about polycystic liver, or one of the liver fluke infections?

DR. CABOT: I never heard of any hereabouts. She lived in this neighborhood, where we do not have liver fluke.

CLINICAL DIAGNOSIS (FROM HOSPITAL RECORD)

Bronchial asthma.
Polyserositis.
Pleurisy with effusion.
Pericarditis.
Peritonitis.

DR. RICHARD C. CABOT'S DIAGNOSIS

Possibly trichiniasis.

ANATOMIC DIAGNOSIS

1. *Primary disease.*

Polyserositis, subacute.
Endarteritis, multiple.
Acute endocarditis, streptococcus viridans (alpha), hemolyticus (beta) and non-hemolyticus (gamma).

2. *Secondary or terminal lesions.*

Acute central necrosis of the liver.

DR. MALLORY: I think I agree with the doctor who says she had Pick's disease. Pick's disease as ordinarily described consists of old fibrous adhesions over all the serous surfaces of the pericardium, pleura and peritoneum, with or without concurrent effusions. But in all probability it has an acute stage, and this case is an instance of the acute stage, the second I have ever seen. Slight degrees of multiple serositis are common in acute rheumatic fever, particularly in children, but cases of so acute a course where the serous involvement predominates from the start are uncommon. I have not run across similar case reports in the literature, although I have not made an extensive search. There was about 400 cubic centimeters of fluid in the peritoneum, a small amount, probably hardly diagnosable, in which there were a number of flecks of fibrin. There were patches of marked congestion on the peritoneal surfaces. In the right pleural cavity there was 1200 cubic centimeters of turbid fluid, in the left 700 cubic centimeters, and there were a few fibrous adhesions on both sides. From the pericardium we obtained 800 cubic centimeters of turbid fluid with fibrin and marked beginning organization of the fibrin on both sides. The heart itself was not weighed on account of the partially adherent pericardium, but it appeared normal or slightly small in size, certainly not hypertrophied. The liver, instead of being big, was small, weighing only 1330 grams, on cross section showing very wide centers to the lobules, which were also somewhat depressed. That is characteristic of passive congestion except that in straight passive congestion the liver is also somewhat enlarged. So we surmised from the gross appearance that there was a considerable degree of necrosis in the liver in this case. Microscopic examination confirmed this.

The spleen was very slightly above normal in weight. The kidneys were normal. The other organs were entirely negative.

I should like to speak for a moment of one other quite similar case we had a while ago. A young woman of twenty-four who had been married about a year and a half developed an acute rheumatic fever entirely typical in character. After a few weeks she developed a pericardial friction rub which disappeared in an-

other week. The pericardial area of dullness seemed to increase in size. The pericardium was tapped and nearly a liter of fluid was withdrawn. She was tapped repeatedly and fluid was withdrawn on numerous occasions, but towards the end of her illness they were unable to get fluid from the pericardium. Then they tapped the pleural cavities until it became difficult to get fluid from those. During the last two weeks of her illness she developed a definite ascites. That was the last to appear. It was a perfectly straight transition from rheumatic fever into a rapid polyserositis of about four months' duration as I remember. The most significant difference between that history and this is the absence of eosinophiles in the first case. But pathologically the organs in gross were the same except that more fibrosis had occurred in the early case than in the one we are discussing to-day.

Microscopically there was one common finding in both cases which was quite unexpected, that throughout the body not only in the serous surfaces, which were evidently pathologic, but in the other organs, the pancreas, the adrenals, the tubes, the heart itself, there was a widespread endarteritis of a large proportion of the smaller vessels. These lesions seem to be a very essential part of the picture, and are further evidence of the rheumatic nature of the process.

The bacteriologic findings in both cases were similar and quite interesting. From both cases we grew streptococci and in both cases there were present the viridans type, non-hemolytic streptococci, and also hemolytic streptococci. Bacteriologists nowadays have succeeded without a great deal of difficulty in converting more or less at will the non-hemolytic streptococcus into the viridans by varying the nature of the culture medium. So far as I know one rarely gets any evidence of any such possible conversion of one type of streptococcus into another occurring in the human body. I think these two cases suggest it.

Dr. Cabot: You would say this was a type of streptococcus infection? The streptococcus is prone to hit the serous membranes, as it does here.

Dr. Mallory: Probably. I am not absolutely certain of that. I think that the streptococcus in these two cases probably must be interpreted in the same way as finding streptococci and culturing them from the heart valves in cases of acute rheumatic heart disease. It may mean that rheumatic heart disease is due to streptococcus, or it may mean only that superinfection with streptococci is the rule in the later stages of this disease.

Dr. Cabot: How do you account for the eosinophiles?

Dr. Mallory: I cannot do it. No one here, not Dr. Rackemann or anyone else, has ever seen eosinophiles in asthma in any such vast numbers. All the serous membranes as well as the blood stream in this case were diffusely infiltrated with eosinophiles. It may be a typical reaction to a specific type of organism, although I think it is unlikely. I think probably some innate peculiarity of her disposition caused the reaction of eosinophiles instead of polymorphonuclears.

Dr. Cabot: Will you say a little more about the liver?

Dr. Mallory: The liver I think had some degree of passive congestion at the end, and undoubtedly there was acute hemorrhagic central necrosis, which would account for the jaundice and for the relatively small size of the liver.

Dr. Holmes: Was there sufficient fluid in the abdomen to account for the high position of the diaphragm?

Dr. Mallory: There was three-quarters of a liter. Both lower lobes were collapsed, though I assumed that this was due merely to pressure of the fluid within the chest itself.

A Physician: Was there any evidence of asthma?

Dr. Mallory: Nothing that we can make out except a slight degree of eosinophilia.

Dr. Cabot: I feel somewhat comforted in missing this diagnosis. I have never seen anything like this before, so I could not expect to recognize it. The only other cases of Pick's disease Dr. Mallory has seen were chronic cases, not at all like this. It is perfectly safe to say we shall never see it again.

CASE 15382

PELVIC INFLAMMATION?

Surgical Department

A married woman thirty-nine years old entered June 30 complaining of pain in the side.

On June 19 she had onset of pain in her left side going around to her back. The next day she had sharp pains in her right side. At admission the pain was in the median pelvic region. There was a constant dull pain, perhaps slightly to the right, with periodic attacks of sharp "twisting" pain lasting about ten minutes, somewhat relieved by stretching or ice bag. The attacks were more frequent and severe at night. She also had a "cord-like constricting" pain in the upper abdomen. Since the onset she had vomited greenish slimy material, more frequently at night.

She gave a past history of severe pains in her legs at twelve years. At twenty-five she had an attack called "inflammation of the bowels", when she also had abdominal pain and vomiting. The same year she was assaulted, and soon afterwards had a rash, genital sores, trouble with her eyes, and a very strongly positive Wassermann. She was given ten iodobismuth of quinine treatments. She was told that she needed fifteen. She had had at least three mis-

carriages. Two years before admission she was treated for late syphilis at the South Medical Department. Dr. Young was given also a history of attacks of lower abdominal pain for several years, accompanied by profuse leukorrhea and irregularity of periods. Six weeks before admission she had a rather severe attack of this sort. Her eyesight and hearing were very poor. She had been treated for dacryocystitis at the Eye and Ear Infirmary.

Her family history is not significant.

Clinical examination showed an unintelligent woman who appeared quite ill. Over the right clavicle was a keloid scar. Lungs: occasional coarse bronchial râles. Heart normal. Abdomen: tenderness in both lower quadrants and over the uterus. No masses or spasm. The patient did not however relax well. Pelvic examination: old lacerated perineum; cervix possibly slightly softer than normal, but uterus very hard and acutely anteflexed. Marked tenderness on motion of cervix. No masses felt. Tenderness in both vaults, especially in the right. Extremities normal. Pupils slightly irregular, reacted sluggishly to strong light. Knee jerks much increased. Possible Babinski, atypical.

Before operation amount and specific gravity of urine not recorded, urine alkaline, a slight trace of albumin, a few leukocytes. Blood not recorded.

Before operation temperature 98.6° to 100.5°, pulse 70 to 91. Respirations normal throughout.

July 2 operation was done.

Discussion

BY EDWARD L. YOUNG, JR., M.D.

This patient was a woman whom I went over myself, and I thought at the time of Dr. Cabot's dictum that given an intelligent patient the diagnosis can nearly always be made on the history alone, without examination; because this patient was very much the opposite of intelligent and the story obtained from her was not so clean-cut as could be wished. Nevertheless the whole picture, the story and the physical examination, pointed very definitely to an ordinary pelvic inflammation with possible abscess formation. There did not seem to be any question about it, nor does there now as I read the history over in retrospect, so that no other diagnosis was put down as a pre-operative diagnosis. What other things should we consider in a story of this kind? An ovarian cyst or a fibroid with a twisted pedicle must always be considered possible. A thing which crops up once in a while and must be considered is appendix abscess with an atypical history and pathology. Tuberculosis, malignancy and actinomycosis very rarely are found.

PRE-OPERATIVE DIAGNOSIS

Pelvic inflammation.

OPERATION

Spinal novocain. The abdomen was opened and a large abscess found in the upper part of the pelvis, formed by loops of bowel and by the uterus. This was broken into and about four ounces of pus evacuated. A small bit of tissue suggested a necrotic abscess. Two cigarette drains were placed in the abdomen.

PATHOLOGIC REPORT

Appendix. A small irregular strip of soft reddish tissue. On microscopic examination it consists chiefly of granulation tissue showing a marked acute inflammatory infiltration. One area contains smooth muscle and suggests a portion of the appendiceal wall.

Acute inflammation.

Further History

After the operation there was drainage of large quantities of thin purulent material. There was no pain. The chart was a little elevated. July 19 the last wick was taken out and the wound strapped. July 22 the patient was discharged.

Further Discussion

The operative findings were a considerable surprise. This sort of case has to be discussed once in so often to make us remember Dr. Maurice Richardson's statement that appendicitis can never be ruled out in any abdominal or pelvic condition. The situation and appearance of the abscess, particularly its odor, together with the pathologist's report, make it almost certain that this was in fact a gangrenous appendix which had sloughed off and formed a thoroughly walled-off abscess, and that after the wound heals the patient will be cured.

LATER NOTE

On July 29 and August 17 the patient came to the Out-Patient Department for dressings. At the second visit there was practically no discharge from the wound.

DIAGNOSIS

Acute appendicitis with abscess.

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PYELITIS IN INFANCY

IT is apparently necessary only to hold to a concept sufficiently long to have it blasted by more modern and more accurate methods of analysis. We have long cherished an idea of the pathology of pyelitis; it has rarely been questioned; the only controversies which have been waged are as to whether it is an hematogenous or an ascending infection, and how it should be treated.

Wilson and Schloss, however, in the *American Journal of Diseases of Children* for August, 1929, now bring forward carefully collaborated evidence which indicates that inflammation of the renal pelvis is rarely, if ever, the cause of pyuria in children and the real cause is due to renal pathology of quite a different nature.

The conclusions of these investigators are drawn from the post-mortem examination of forty-nine infants and children whose urine contained pus during life, and who died from a variety of causes. In five cases no anatomic basis for the pyuria was disclosed. In one case a cystitis seemed sufficient to account for the pyuria. In two cases only was the epithelium of the renal pelvis inflamed, and in these, as in the remaining cases, the main lesions consisted in areas of acute suppuration in the interstitial tissue of the kidneys, commonly adjacent to blood vessels and frequently showing small abscesses.

These, it may be argued, are the severe cases; those which came to their ends as a result of acute illness of which the kidney affection was at least a part. It is significant, nevertheless, that these cases with clinical signs to which we are accustomed to give the name pyelitis, showed inflammation of the pelvis in only two instances. Further evidence is forthcoming. Cases are cited with recovery from so-called pyelitis and death from remote causes at a distant date, in which the healed lesions of acute suppurative nephritis were found at autopsy; in another case, uncomplicated, the nature of the pathology was demonstrated at operation.

Wilson and Schloss do not claim that pyuria in infants is always due to suppurative interstitial nephritis. They believe, however, that other conditions to which it may be due are relatively rare. These include congenital anomalies of the urinary tract, especially those leading to dilatation of the ureters and pelves of the kidneys, cystitis and renal calculi. The fact of inflammatory foci in the interstitial tissue of the kidney in the absence of inflammation of the bladder, ureters or pelvis is decidedly in favor of the hematogenous origin of infection.

Evidence so convincingly arrayed, collected under the direction of so careful an observer as Dr. Schloss, must certainly come to be accepted as pointing to the true nature of so-called pyelitis.

CHEMICAL WARFARE IN THE HOME

THE recent deaths in Chicago from methyl chloride poisoning originating from electric refrigerating plants and the not infrequent occurrence of more or less serious chemical injuries in the home or in the factory are striking reminders of the extent to which chemistry is being brought into service in our everyday life and consequently new dangers created.

It has been the lot of the writer to come in contact with several cases of chemical injuries of different types—pulmonary edema from the inhalation of ammonia fumes, phosphorus burns of the skin, second and third degree burns from concentrated solutions of sodium hydroxide, and our old enemy carbon monoxide poisoning. With the exception of this last, it is startling how little information can be obtained from commonly available textbooks and how little is taught in the medical school courses with regard to the treatment of these conditions. Of course common sense goes a long way, but common sense and chemical knowledge are not necessarily synonymous as was shown in a case of phosphorus burns where the addition of yellow phosphorus to water had caused an explosion

and spattering of masses of the phosphorus with resultant burns. The first aid treatment used was to attempt to wash off the phosphorus still present in the burns with water, resulting in further extension.

With the development of new hazards with which the physician has neither the time nor the technical knowledge to keep pace, it would seem worth while to have a pamphlet prepared and revised from time to time that would give the signs, symptoms and approved treatment of the new poisons that are increasingly peacefully penetrating our homes. With some, no less deadly than the poison gases utilized in the World War, the constant menace, if anything goes wrong with the mechanism for their control, is a veritable sword of Damocles.

THIS WEEK'S ISSUE

CONTAINS articles by the following named authors:

LANMAN, THOMAS H. B.A., M.D. Harvard 1919. F.A.C.S. Assistant in Surgery, Harvard Medical School; Assistant Visiting Surgeon, Children's Hospital, Boston. He writes on: "Ovarian Tumors in Childhood with Report of Five Cases." Page 555. Address: 264 Beacon Street, Boston.

GRAVES, ROGER C. A.B., M.D. Syracuse University College of Medicine, 1918. Urologist to the Carney Hospital; Genito-Urinary Surgeon to the Pondville Hospital; Member of consulting staff of Brockton, Quincy and Winchester Hospitals; Member of American Association of Genito-Urinary Surgeons. Address: 12 Bay State Road, Boston. Associated with him is:

DOHERTY, JOHN L. M.D. Tufts College Medical School, 1925. Assistant Surgeon to the Outpatient Department, Carney Hospital. Address: 350 Commonwealth Avenue, Boston, Mass. They write on: "Experiences with Spinal Anesthesia in Genito-Urinary Surgery." Page 563.

PEIRSON, EDWARD L. JR. S.B., M.D. Harvard 1925. Surgical House Officer, Massachusetts General Hospital 1926-1927. Resident Urological Service, Massachusetts General Hospital 1928. At present, Visiting Physician to the Outpatient Department, Salem Hospital; Assistant Urological Consultant to the Tumor Clinic, Massachusetts General Hospital. Address: 33 Summer Street, Salem, Mass. Associated with him is:

BARNEY, J. DELLINGER. A.B., M.D. Harvard 1904. F.A.C.S. Chief of Service, Urological Department, Massachusetts General Hospital; Assistant Professor of Genito-Urinary Surgery, Harvard Medical School; Consulting Urologist, Salem Hospital; Waltham Hospital; Cable Hospital, Ipswich; Gale Hospital, Haverhill; U. S. Marine Hospital, Chelsea; Massachusetts Eye and Ear Infirmary; Hunt Memorial Hospital, Danvers; Peterboro Hospital, Peterboro, N. H. Address: 87 Marlborough Street, Boston. They write on: "The End Results of Operations for Nephroptosis and Aberrant Renal Vessels." Page 568.

BERLIN, DAVID D. M.D., Tufts College Medical School 1923. Assistant in Surgery, Out-patient Department Boston City Hospital and Beth Israel Hospital; Instructor in Anatomy, Tufts Medical School; Teaching Assistant in Surgery, Tufts Medical School. He writes on: "Position in the Treatment of Fracture of the Carpal Scaphoid." Page 574. Address: 68 Bay State Road, Boston.

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MISCELLANY

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(Continued from page 548, issue of September 12)

Dr. B. P. Babkin of Montreal studied the innervation of the salivary glands. He found that both the parasympathetic and sympathetic nervous system supply the salivary glands with secretory fibers and that ergotamine paralyzes the sympathetic motor fibers. Histamine besides activating the gland salivary secretion and pressing out the saliva from the gland is active after poisoning the gland with ergotamine and atropine.

The effects of reabsorption of urinary constituents, from the lower ileum, were made known by Dr. F. W. Hartman of Detroit. In his study he used a double anastomosis by dividing the middle portion. The proximal portion was anastomosed to the ileum just above the caecum and the distil end was anastomosed to the fundus of the urinary bladder. Thus an easily controlled diversion of urine into the bowel was produced without disturbing the ureters. Hydro-ureter, hydronephrosis, and pyelitis were not encountered. The kidneys first hypertrophy often to twice the normal size and later show marked tubular degeneration and lipoidosis. The glomeruli were rarely affected up to the fifth month.

Dr. W. N. Boldyreff of Battle Creek, Michigan, reported his findings on the disturbance of the acid-base balance in the stomach and small intestines as a cause of anemia. During stomach digestion hydrochloric acid is present up to 0.5 per cent., but in the duodenum it is below 0.1 per cent. Since it is known that acids destroy red blood corpuscles in vitro, Dr. Boldyreff suspected that acid which is not absorbed in the stomach but is readily absorbed from the intestine might enter the blood and destroy the red corpuscles. Hence, the excess of acid in the intestine may cause anemia. It might also be conceived that neutralization of acids in the stomach by the alkali of the pancreatic juice may also prevent the destructive effects of acids on erythrocytes. With the introduction of acids into the stomach and in the small and large intestines, and in a dog with both pancreatic ducts ligated, acids are absorbed into the blood from any part of the intestine and in one and one-half to four hours are capable of decreasing the number of erythrocytes in the blood by from one to two million. Repeated introductions of 0.5 per cent. hydrochloric acid into the stomach caused in two or three weeks a drop of erythrocytes of more than one million with the appearance of pathological forms. Cessation of such introductions brought the cell count to normal in several weeks. Thus, the excess of acids in the digestive apparatus produced by excess of acid secretion, deficient neutralization and acid production from the food in any part of the digestive canal is followed by the advent of anemia resembling the pernicious type.

The results of their study of the "Function of the Duodenum" were reported by Dr. L. Hauswirth of New York and Dr. F. Silberstein of Vienna. They devised a method that permits the duodenum to be resected and the pancreatic and bile ducts to be implanted in the jejunum in order to ascertain whether the duodenum has any specific function. They demonstrated a dog's papilla implanted in the jejunum. The dog had survived the operation for more than one year. The changes in the blood picture and in the iron content of the blood after operation, the consequences of removal of the duodenum for the metabolism of carbohydrates and proteins, and the immunity to poisons was investigated.

Drs. H. E. Honeywell, R. Adams Dutcher and J. O. Ely of State College, Pennsylvania studied the "curative technique of Vitamin A as shown by varieties of yeast." They fed four yeast preparations which were designated as I, II, III and IV, in varying amounts, in curative tests for vitamin A. Yeast I possessed the anti-xerophthalmic factor but without evidence of the growth promoting properties which are characteristic of vitamin A. Yeast II, made by the same company three years later, possessed measurable amounts of the growth promoting A factor, but practically all the animals were afflicted with xerophthalmia. Yeasts III and IV, which were manufactured by other companies, possessed no anti-xerophthalmic properties nor was there any evidence of the presence of the vitamin A growth factor. When two drops of butter fat were added at the end of the period, after the bodies' stores of vitamin were exhausted, the growth response seemed to be dependent on the kind and amount of vitamin A free yeast used as the source of the vitamin B complex. Subsequent studies in which these yeasts were fed in varying amounts during the depletion period and during the curative period have led to the following conclusions: (1) That yeast may contain vitamin A. (2) There was some evidence to indicate the multiple nature of vitamin A, but, owing to the exhaustion of the supply of that yeast that phase of the work could not be continued. (3) That their ability, in the past, to obtain the proportion of xerophthalmia that had been reported by other workers had been explained. (4) That the quality and quantity of the vitamin B complex exert a definite effect on growth response, even when a constant source of vitamin A in butter fat was supplied. (5) That the quality and quantity of the vitamin B complex in the preventive and curative periods influenced the growth response when two drops of butter fat were added which lead the investigators to believe that the size of the animal, at the beginning of the curative period, is not the sole explanation. (6) That comparative quantitative determinations of vitamin A in foods are not possible unless each new supply of yeast is tested and the method of testing standardized. These workers obtained differences in curative response, on two drops of butter fat, which vary from one hundred to three hundred per cent., depending upon the kind and amount of yeast ingested; e.g., 0.2. gram of yeast IV was superior to 0.6 gram of yeast I.

Dr. Wendell H. Griffith of St. Louis investigated the "Effect of Liver and of Yeast on the Consumption and Utilization of Food". According to Dr. Griffith, whole dried yeast, which is a richer source of vitamin B, than of vitamin B2, has been found to be related to the utilization of ingested food rather than to the amount of food. An aqueous extract of liver which is a richer source of B2 than of B, has been found to stimulate the appetite and to increase the consumption of food but not to affect the utilization of food. Rats fed a basal diet plus 150 mg. of yeast daily grew less rapidly than controls on the stock diet. When the yeast was increased to 300 mgm. daily the rate of growth equalled that of the controls. The addition of the yeast increased the rate of growth 47 per cent. and the food consumption only nine per cent. When the basal diet was supplemented daily with 300 mgm. of yeast and 0.5 c.c. of an aqueous extract of liver the rate of growth far exceeded that of the control animals. The added liver extract increased the rate of growth thirty-seven per cent. and the food consumption twenty-one per cent. In a second series of experiments, rats were fed restricted amounts of the basal diet so that equivalent quantities of food of the same calorific value were ingested daily. The calories required per gram increase in weight during the forty days experimental period were as follows: basal diet plus 150 mgm. of yeast, 15.7; basal diet plus 300 mgm. of yeast, 12.2; basal diet plus 300 mgm. of yeast plus liver extract, 12.7. These experiments showed the effect of the yeast in increasing the efficiency of utilization of food and demonstrated that the liver extract was ineffective in this respect. Subsequent experiments demonstrated that extraordinary effect on the appetite of the ingestion of liver was most marked in the first twenty day period and was hardly apparent in the second twenty day period.

Drs. Herbert M. Evans and Samuel Lepkowsky of Berkeley, California, studied "Some Relations of Vitamin B to Fat and Carbohydrate Metabolism". According to Dr. Evans, on a diet of sucrose and casein, more antineuritic B is necessary for growth than with other diets known to us. Replacing the sucrose with only 10 per cent. of fat always lowers

the vitamin B requirements. When fifty per cent. fat is present, animals live at least six months without signs of beriberi. Direct evidence that antineuritic vitamin B is related to carbohydrate metabolism, at least in advanced stages of the deficiency, particularly when the animals show symptoms of beriberi, has been obtained from glucose tolerance studies. Low B animals show reduced tolerance for glucose whereas controls, similarly treated show excellent tolerance.

Great interest was aroused when Dr. Erik Agduhr of Uppsala, Sweden, explained the conclusions resulting from experimentation with cod liver oil. His subject was "Cod-Liver Oil in Therapeutic Doses Causes Organic Changes". Besides the favorable vitamin action due to cod-liver oil, it possesses an unfavorable, toxic influence. The alterations of the organs induced by the toxic property of cod-liver oil have been shown to exist in man and in various kinds of animals such as white mice, rats, rabbits, calves, pigs, dogs and cats. The lesions of the organs are greater in degree and in a greater number of organs when large doses of cod-liver oil are given, than when small quantities are employed. The therapeutic cod-liver oil doses recommended in several textbooks are capable of producing lesions both in man and in animals. The character of the organic changes varies, but pigment degeneration, fatty change, transformation into connective tissue and calcareous deposits are fairly common lesions caused by cod-liver oil. The composition of the normal, basal diet plays a certain rôle as to the resistance offered by animals to the toxic property of cod-liver oil. Even when animals are provided with good, basal diet, large doses of cod-liver oil given for long periods can induce lesions. Good ventilation and good hygienic conditions in general, as well as summer sunlight, add essentially to the power of resistance of animals against the unfavorable toxic influences of cod-liver oil. A radiation of cod-liver oil with ultra-violet light seems to diminish its toxic property. A radiation of the basal diet with ultra-violet light as well as of the experimental animals themselves seems to increase the resistance offered by animals to the toxic property of cod-liver oil. Gum arabic cod-liver oil emulsion (or as grasinol) has a more unfavorable influence on experimental animals than corresponding doses of pure cod-liver oil. Parallel experiments with various kinds of fats—those obtained from pigs, cattle and dogs; olive oil, rape oil, sesame oil, cocoa fat, and whole oil, have not caused alterations comparable with those brought about by cod-liver oil. In the case of most fats and oils experimented with, no anatomical alterations have been observed. By means of extraction with acidulated alcohol, and by oxidation under heating to 130° C., cod-liver oil has been made vitamin poor and even practically vitamin free. When vitamin poor cod-liver oil was used, changes in the organism have been caused which were somewhat less in degree than those brought about by the use of vitamin rich cod-liver oil. The toxic effect of cod-liver oil is caused by a co-öperation of several of the constituents of the oil. Dr. Agduhr has shown that the lesions caused by cod-liver oil in certain cases can be healed by omitting the oil and by using the basal diet.

Much interest was shown in a paper by Dr. Boris Sokoloff of Prague entitled "Physiological Studies of Malignant Cells". While observing the regeneration of protozoa he noted that a combination of iron and the extract of the suprarenal gland possesses the property of regulating the nucleo-cytoplasmic ratio of the protozoa. This compound causes liquefaction of the protoplasm which acts as a cytothrombin. Analyses of the suprarenal glands during cancer and sarcoma of animals demonstrated that the cortex reacts very sensibly to malignant neoformation; its super-activity is observed at the beginning of the neoplastic process, which later is replaced by a fatty change. When all the cortex is filled with the fatty substances the weight of the gland is three or four times greater than normal. Especially demonstrative are the troubles of the iron incorporations. Dr. Sokoloff performed tests with different tumors. He used the preparations of conferral, which is a combination of iron and a dialyzed extract of a suprarenal gland. The physiological action expresses itself in its regulation of the metabolism of cells and its influence on the nucleo-cytoplasmic ratio, mitochondria and oxidation. Strengthening this preparation by adding to it tri-naphthapara-rosanilin a violent liquefaction in the malignant tumor cells was produced by this catalysis. The action was selective. For these tests Dr. Sokoloff used animals having four kinds of tumors: R. Sarcoma No. 10; R. Sarcoma No. 39; M. No. 180 and F. R. Carcinoma. The animals adjusted themselves easily to the injections. Dr. Sokoloff performed about one thousand experiments. The process of liquefaction began rapidly; in small tumors sclerosis set in within three to five days. Larger tumors dissolved slowly, within about fifteen days. In the majority of this series the percentage of cases in which tumors disappeared reached one hundred. In other series, about twenty per cent. of mortality followed, owing to rapid liquefaction of the tumors. A smaller dose and fewer injections prevent the mortality. Out of two hundred animals, whose growths were stopped two months before, only five suffered a relapse. From a cytological standpoint the given chemical compound acts selectively, by local action on the cancer cells, causing liquefaction. The granules of this combination are surrounded by large vacuoles which are remains of cells. The mitochondria change viscosity of the protoplasm and coagulation of the cells rapidly causing death of the latter.

A demonstration of the pathology of vitamin deficiencies by Dr. S. B. Wolbach, Professor of Pathology at Harvard, Dr. Percy R. Howe and C. F. Church was of especial interest.

It was explained that lack of sufficient vitamins in the diet produces in civilized men diseases which are for the most part unknown among the savage races, owing to modern methods of keeping and storing food. Dr. Wolbach's exhibit showed three different studies of the effect of the lack of certain vitamins in the diet. Lack of vitamin C, according to Dr. Howe, produces a condition similar to the old-fashioned scurvy, although such diseases are rarely now encountered, owing to the fact that this important element is practically never eliminated from the everyday diet. "Of all the vitamins", Dr. Howe said, "the anti-scorbutic is the easiest destroyed in food because of cooking or storing. This deficiency is observed in the supporting tissue of the cells of the body which are broken down; one obvious effect is seen on the bones and teeth. Eating fresh raw foods

or drinking orange juice will amply counteract any ill effects, for these foods will supply the missing element. The primitive races are seldom affected by these difficulties, for their diet is mostly simple wholesome food eaten without much preparation. A second study exhibited by this group dealt with a deficiency of the fat soluble vitamin A. This element found in milk and eggs is not lost through pasteurization of milk. A lack of this element prevents secretion of the mucous glands resulting in disorders in the lungs, digestive tract, or eyes. The third study dealt with the problem of rickets in growing children, or the poor development of the bones. The ingestion of approved cod-liver oil, containing the vitamin D factor, counteracted the ill effects of this condition.

A study concerning "The Production and Relief of Atelectasis and of Pneumonia" was presented by Drs. Pol N. Coryllos and G. L. Birnbaum of New York; and Drs. Yandell Henderson, H. W. Howard and E. M. Radloff of New Haven.

It was shown that in patients after surgical operations the development of the so-called massive collapse, or atelectasis, of the lung is an essential factor or stage in the development of pneumonia. Deep breathing induced by inhalation of carbon dioxide tends to dilate the lung. By thus overcoming atelectasis, the development of pneumonia may be prevented in pneumonia not associated with surgery bronchial obstruction may exist and produce atelectasis which in turn causes accumulation of exudate and consolidation. The purpose of the experiments of the group was to determine whether the deep breathing induced by inhalation of carbon dioxide will open up areas of the lungs in pneumonia, and thus prevent consolidation. In its essentials this treatment of pneumonia and atelectasis is similar to that for the treatment of carbon monoxide asphyxia. In the experiments, dogs were narcotized with amytal and a virulent culture of pneumococci type II was introduced through a bronchoscope into the right lung. Pneumonia generally developed, and in nearly all such cases, if not treated with inhalation of carbon dioxide, the animals died in from one to three days. If, however, soon after the development of pneumonia the animals were placed in an atmosphere of 5 to 7 per cent. carbon dioxide, the collapsed and pneumonic areas of the lung cleared up to a large extent in a few hours, and many of the cases made a complete recovery. The demonstration consisted of x-ray pictures illustrating the collapse of the lung induced when an obstruction was placed in the bronchus, and the rapid redistention of the lung when the obstruction was removed and the animal placed in a chamber containing 5 to 7 per cent. carbon dioxide in air. Similar x-ray pictures were exhibited of atelectasis in dogs with pneumonia, together with pictures showing the redistention of the lung induced by inhalation of carbon dioxide.

Dr. Raphael Isaacs of Ann Arbor, Michigan, conducted a demonstration of "Certain Features of the Physiologic Histology of Bone Marrow". He reported that study of fresh bone marrow on a warm stage shows that the cells are capable of considerable locomotion, and are not bound down by intercellular fibrillae such as fixed sections suggest. If the slide is tilted the blood flows in the vessel and there are no capillary-free groups of cells. Marrow cells placed in contact with plasma or serum separate easily and the staining properties of the tissue cells change remarkably to that of the blood stream cells. Myeloblasts and myelocytes then stain as they do in the blood films of chronic myelogenous leukemia. Immature erythrocytes crumble when placed suddenly in contact with plasma and serum. This suggests that the cells are not bathed in plasma or lymph and that the blood circulation in marrow is a closed system. The nature of the intercellular substance is shown by extracting marrow with physiologic salt solution. In filtered solutions the intercellular tissue fibrillae are fixation artifacts, precipitated from a more or less jelly-like protein containing solution between the cells. The thicker the "jelly" the thicker the precipitate remaining in prepared sections of tissue, and the more liquid the "jelly" the less protein per unit area and the fewer the fibrillae. With this criterion it is seen that the immature cells are imbedded in a very thick jelly while the mature cells evidently have the power of liquefying the surrounding substances and are thus in a more fluid medium before they enter the blood vessels. This is entirely confirmed by the distribution of the cells on slides in fresh marrow smears.

Dr. E. W. H. Cruickshank made known his study on "The Effect of Insulin on the Utilization of Sugar in the Normal and Diabetic Heart". He used the isolated heart lung preparation of Starling. The heart and lungs of dogs were perfused with defibrinated dog's blood. It is known that the isolated normal heart responds to insulin by storing glycogen provided that the blood sugar does not fall to an extremely low level. The diabetic heart, however, will not react in the same manner to injected insulin unless the blood sugar be maintained well above the normal. The average figure for the utilization of sugar by the normal isolated heart, when no sugar is added to the blood during a two hours' experiment was 2.24 mgm. per gram of heart muscle per hour. Upon the addition of sugar to the perfusing blood the storage of glycogen and the utilization of sugar are markedly increased. Insulin increases sugar utilization about threefold in the normal, while in the heart fed with sugar utilization is increased sixfold. Perfusion of a diabetic heart with normal blood results in a figure for sugar utilization which averages 4 mgm. per gram of heart muscle per hour. However, perfusion of a diabetic heart with diabetic blood, that is, with blood from a dog nine days diabetic, results in no utilization whatsoever. It would appear that insulin is eliminated rather thoroughly from the blood in the course of six to eight days after complete pancreatectomy. Insulin added to diabetic blood perfusing a diabetic heart increases the power of the heart to utilize sugar 7 mgm. per gram per hour, but seems to fail to effect a synthesis of glycogen. Even when insulin is added at the rate of ten units every half hour, no glycogen synthesis is obtained. If, however, normal blood be added, the glycogen content of the heart is usually well maintained at or about the normal, and the sugar utilization markedly increased if the blood sugar percentage be kept at or above the normal.

Drs. S. Soskin and W. R. Campbell of Toronto reported on the "Utilization of Carbohydrate by Totally Depancreatized Dogs Receiving no Insulin", showing that totally depancreatized dogs, in which the absence of islet tissue was subsequently verified by post mortem examination, have been maintained without insulin for as long as four weeks. Fed on

protein alone, these animals lose weight steadily, but remain bright and active throughout most of the experiment. For one to two weeks after cessation of insulin administration the animals exhibit a Respiratory Quotient of 0.700 or less. The D:N ratio, which starts off at high levels, has frequently fallen below 2.0 by the end of the first week. The ketosis as judged from urinary excretion, reaches its height about the fourth or fifth day, then steadily declines. During the remaining one to three weeks of the experiment the R. Q. steadily rises to values as high as 0.90. During this time, the CO_2 combining power and CO_2 content of the blood are not appreciably diminished, and may even rise. The D:N ratio continues to fall, frequently to level less than 1.0. If insulin be now cautiously resumed, the animal may be revived. It gains weight steadily, and subsequently determinations will again start off with "diabetic" R. Q.'s and D:N ratios. The addition of fifty grams of glucose to the regular diet, from time to time during the latter half of an experiment, results in the retention of a progressively increasing amount of the administered glucose. The glucose retention, often as much as 60 per cent., is accompanied by a variable effect on the R. Q., and a definite lowering of the urinary nitrogen and ketone excretion. In view of these results it seems logical to revise some conceptions regarding diabetes and metabolism.

"The Relation of the Liver to the Action of Insulin" was investigated by Drs. John R. Murlin, Harold B. Pierce and Donald E. Gregg of Rochester, New York. This study was undertaken in three ways: A. In nitro, employing incubation and aseptic technique; B. perfusion of the liver; and C, treatment of dogs having pancreatic diabetes. Under the first method they concentrated on the proportion of true sugar to non-sugar reducing substances with and without the addition of insulin, before incubation, after incubation for from two to twenty-four hours, and after hydrolysis of the remaining glycogen. It was found that the addition of some organic acids affects the distribution of the reducing substances as well as the total amounts recoverable after incubation and hydrolysis. With the second method it was shown that with proper precautions there was no demonstrable transformation of fat to carbohydrate in the perfused liver. With the third method, it has been found that the absorption of insulin from the alimentary tract of the depancreatized dog is materially enhanced by various liver products; as bile, salt solution suspension of liver pulp and some extracts. These investigators believe that the favorable effects of liver pulp on diabetes reported by Blotner and Murphy were due to insulin already present in the fresh liver, its absorption being aided in certain individuals by bile or its precursors and possibly by some extractive substance.

A problem in nutrition, that of feeding infants, has been carried further toward solution by the findings of Dr. R. L. Hill of Logan, Utah, who has developed a test at the Utah Agricultural Experiment Station by which the toughness of the curd formed by the normal coagulation of milk can be measured. He declared that it has also been demonstrated that the results obtained from the use of this test is a direct index to the digestibility of the milk by infants. A wide range has been demonstrated in the toughness of the curd and resultant digestibility of milk from different cows in the same and different breeds of cattle. His results indicate that on the average not more than ten per cent. and in many cases a lower percentage of the cows give milk that is soft curded enough for the use of delicate infants. The results obtained by feeding the milk to infants would indicate that the toughness of the curd of the milk is far more important than the fat content in choosing a milk for infants. By the use of this curd test on the milk from a large number of individual cows, a soft curded milk may be obtained. It is possible to obtain soft curded milk with either a high or a low fat content. It is also possible to obtain cow's milk that closely approaches human milk in its digestibility by infants. Such milk, when fed to infants, requires little, if any, dilution or modification.

A milk substitute which has virtually all the nutritive elements of cow's or mother's milk and which can be produced at one-fifth the cost, has been developed by a young Chinese research worker, Dr. Ernest Tso, of Peking Union Medical College, Peping. The details of the process as well as the facts showing indubitably the ability of the substitute to take the place of ordinary milk in the rearing of infants and older children were disclosed at the Congress by Dr. Tso, a Harvard Medical School graduate. While not so important to this country as to China, where the few cows and general poverty have put cow's milk at a premium, the soy-bean milk is expected in time to find an important use in the United States and abroad not only as an inexpensive substitute in the rearing of infants, particularly foundlings, but is believed by its originator to have special value for children subject to eczema caused by cow's or mother's milk. The soy-bean milk, as shown by exhaustive tests, does not produce any skin disorder. Dr. Tso's discovery of the successful formula came after three years of research, undertaken to solve the problem of supplying milk cheaply to North China, to those unable to afford cow's milk. As finally worked out, his method is to grind the soy-bean after it has been water soaked, obtaining a milk-like fluid, to which is added certain other food elements to give it practically the full nourishing qualities possessed by ordinary milk. Six infants, one from birth and the others from the time they were a few weeks old, have been reared to from six to nine months by Dr. Tso on the soy-bean milk. During that time they received no cow's or mother's milk and they were finally taken off the soy-bean diet only because Dr. Tso felt that the sustaining qualities of the milk having been conclusively demonstrated, they must make way in his hospital ward for another group of infants. The children reared by him on the soy-bean diet appear plump and vigorous, and altogether as healthy and as well developed as children raised on animal protein milk. Some of the children have been able to stand up even earlier than the average baby. The milk can be produced in powdered form, to which water and other simple ingredients may be added. Its shipment thus in concentrated form is feasible. The description of the milk follows. It contains 4.4 per cent. proteins, .8 per cent. carbohydrate, 0.018 per cent. calcium, 0.057 per cent. phosphorus, and 0.41 per cent. ash. In the formula suggested the proteins constitute twenty to twenty-two per cent. of the caloric intake. Fifty per cent. of the total calories are obtained from this milk, the supplementary food being cane sugar, corn or rice starch, cod-liver oil, calcium lactate, sodium chloride and

cabbage water, the latter as the chief source of vitamin C. This mixture is biologically complete. The milk alone is comparable to cow's milk in vitamin A and richer in vitamin B, while vitamin C has to be added. Vitamin D is believed to be absent. Without extra additions, the milk is inadequate in sodium chloride and calcium. Dr. Tso did his graduate work at the Boston Children's Hospital.

Recent experiments on the effect of an exclusive meat diet were carried on in New York by Drs. E. F. Dubois, W. S. McClellan, H. J. Spencer and E. A. Falk in their study on the "Metabolic Observations" on two arctic explorers for a period of one year during which they ate nothing but meat. The observations were made before, during, and after the time they received the meat diets. The diet included beef muscle, tongue, liver, kidney, brain, fat bone marrow, veal, lamb, pork and chicken. The fluids taken were meat broth, black tea and water. The daily consumption of the protein varied between 100 and 135 grams, of fat 175 and 250 grams, and of carbohydrate, contained in meat, 5 and 10 grams. The diet was acid in nature and deficient in calcium. The men lost two to three kilograms in body weight during the first month after which their weight remained constant. No elevation in blood pressure occurred. The kidneys showed no evidence of damage. There was an increase of fat and cholesterol in the blood during the early periods of the observations but no change in the nitrogenous elements. In the urine the acetone bodies were found continuously in small amounts, 0.5 to 5.0 grams per day and the acidity was two to three times greater than when they received mixed diets. The basal metabolism remained at the same level between—10 and—20 per cent. of normal. The effects of protein, of fat and of carbohydrate meals were studied. The dynamic action of protein was slightly greater at the end of the meat diet. The carbohydrate tolerance test with 100 grams of glucose at the end of the meat diet showed a tendency toward a sustained elevation in level of the blood sugar. Negative calcium and phosphorus balances occurred even with the high phosphorus content of the food. The blood calcium remained constant. There were no signs of avitaminosis or any other injurious results of this diet. The two men remained physically and mentally normal.

"Normal Values of Basal or Standard Metabolism, a Modification of the Du Bois Standards" was worked out by Drs. Walter M. Boothby and Irene Sandiford of Rochester, Minnesota. More than 60,000 individual basal metabolisms were done in their laboratory. From that number they selected 6,888 subjects, 1,822 males, 5,066 females, who on careful physical examination revealed no abnormalities which would influence their rate of heat production. The data are expressed on the basis of calories per square meter referred to age and using the height weight formula of Du Bois, and may be procured on application to the authors.

Dr. F. A. Hitchcock of Columbus, Ohio, studied "Variations in the Basal Metabolic Rate Apparently Caused by the Mental State of the Subject." A woman thirty years old was first studied. She was a subject for metabolism tests over a period of about three months. During the first half of this period she took a series of oral and written examinations. The average of eighteen tests made on her before these examinations were completed was 40.12 cal. per sq. m. of body surface per hr. Eight additional tests were made on her over a period of four weeks after all her scholastic work had been finished. These averaged 35.89 cal. per sq. m. of body surface per hr., a drop of 10.5 per cent. The mental relaxation which followed the successful completion of her examinations is the only apparent cause for this decrease in metabolic rate. The second person studied was a woman in her early thirties. During the spring of 1928 her basal metabolism was being determined daily. At this time she was a junior in the college of medicine. On the morning of June 1, the second day of her menstrual period, her B. M. R. was 31.95 cals. per sq. m. of body surface per hr. The average of 54 tests run on this subject during menstrual periods was 32.60 cals. On the evening of June 1 she was on duty for the first time at the University Dispensary and returned to her room very much excited by her experience. The following morning she had a metabolic rate of 42.35 cals. per sq. m. of body surface per hr. On June 4 it was down to 33.23 cals. The only apparent explanation for this temporary increase is the mental state. Dr. Hitchcock noted other similar cases. These demonstrations of the ability of the body to work at a high rate when excited or keyed up mentally and to let down when the mental strain is off seemed conclusive evidence of the importance of considering mental factors in measuring metabolism.

Dr. P. Brandt Rehberg of Copenhagen reported study on "The Influence of Posture on Kidney Function." The influence of posture on the function of the kidney is usually attributed to the variation in the pulse pressure found when posture is changed. It is held by some that the variations are not compatible with the filtration-absorption theory of renal function. A fact generally overlooked is that the colloid content of the blood changes with posture. In a series of experiments the amount of blood cleared of creatinine each minute after ingestion of creatinine was determined. This amount should be identical with the amount of glomerular filtrate formed each minute. The glomerular filtrate so estimated changes with change of posture and the change is in each experiment dependent on the variations in the contents of the proteins of the plasma. The fact that the creatinine excretion varies with the protein content of the blood is held to indicate that the creatinine is excreted through the glomeruli. From the filtrate formed water is absorbed in different amounts under the different circumstances and the variations produced in the solid constituents depend on the ease with which they diffuse back into the blood during the concentration process in the tubules.

"Further Quantitative Studies of the Composition of Glomerular Urine from Kidneys" were carried out by Dr. L. E. Bayliss of London, Drs. B. Freeman, A. E. Livingston, A. N. Richards and A. M. Walker of Philadelphia. In a series of estimations of the chloride concentration of glomerular urine, they obtained evidence which only to a limited degree confirms that previously published by Wern and Richards, namely, that the chloride concentration of glomerular urine is higher than that of the plasma from which it is derived.

"The Secretion of 'Acid' by the Kidney" was studied by Drs. A. B. Macallum and W. R. Campbell of London, Ontario. When five to eight cubic centimeters of a solution of one per cent. ferric ammonium citrate and 0.8 per cent. sodium ferrocyanide were injected intravenously per kilo into the dog, cat or rab-

bit, Prussian blue is excreted in the urine if the animal has been without food for some time but if fed an hour or so before the injection is made, the salts injected appear unchanged in the urine, the so called 'alkaline tide'. Examination of the kidneys of such animals excreting Prussian blue indicates that it is formed only in the cells of the proximal convoluted renal tubules which pass it out into their lumina. The formation of the blue is not due to the action of sodium dihydrogen phosphate, the salt chiefly responsible for the acid reaction of the urine, for when a portion of the solution used for injection is added to acid urine no Prussian blue is formed nor is it formed when a quantity of the solution is added to a saturated solution of sodium dihydrogen phosphate. The facts determined make it evident that in the cells of the proximal convoluted renal tubules the acid which brings about the formation of Prussian blue is hydrochloric, formed as it is in the parietal cells of the peptic tubules when they are secreting acid. The acid is passed into the lumina to react there with any disodic hydrogen phosphate of the glomerular filtrate, converting it into the sodium dihydrogen phosphate of the urine, while the disodic salt formed in the cells of the tubules probably diffuses into the lymph and blood to maintain the normal acid-base balance therein. In the cells of the proximal convoluted renal tubules the reaction involved in the formation of the acid is the same as that involved in the formation of hydrochloric acid by the parietal cells of the gastric tubules. When the latter are in action the disodic hydrogen phosphate is formed in excess, consequently the acid formation in the cells of the proximal renal tubules ceases and the urine is the alkaline.

Drs. U. von Euler and G. Liljestrand of Stockholm reported study on the "Effect of Muscular Work on Human Blood Serum." The velocity with which methylene blue in vivo is reduced by minced muscle affords a possibility of determining the presence of minute quantities of certain highly active substances, among others some hormones, in the serum. During rest, blood serum of normal man accelerates the reduction of methylene blue by muscle in a concentration as low as about 1:400. During muscular work, they found a very considerable increase of that accelerator effect. Thus after heavy work an acceleration was established even in a concentration of 1:12,000. The fact that choline was continually eliminated by the urine and has recently been found there in increased quantities after heavy muscular exercise made it desirable to obtain information whether the effect could be attributed to choline. It was found that choline gives an acceleration of the reduction of methylene blue in a concentration as low as 10^{-11}. The effect could be abolished by atropine 10^{-10} to 10^{-7}. The increased accelerator effect of serum in muscular exercise was also completely abolished by atropine 10^{-5}. Histamine, however which also increases the reduction rate of methylene blue considerably, was not antagonized by atropine. The results are in harmony with the hypothesis that the effect found was due mainly to choline.

The studies on the "Effects of Sympathetic Ganglionectomy and Ramisectomy in Arthritis" by Drs. Leonard G. Rowntree and Alfred W. Adson of Rochester, Minnesota were reported. The clinical findings in an advanced case of arthritis deformans in a young woman of thirty-six suggested the possibility of a relationship between excessive vaso-constriction and the arthritic symptoms. The coldness of the extremities was extreme, with marked sweating, tender, painful and swollen joints and trophic changes in the muscles, skin and nails. Dr. A. W. Adson removed the second, third and fourth lumbar sympathetic ganglia on both sides with immediate and complete cure of the arthritis in the lower extremities which had persisted for three years. Following the operation the patient had no symptoms of arthritis below the waist but was the victim of crippling and disabling arthritis in the upper extremities. The results of the first operation were so gratifying that when the possibility of a second operation to relieve the upper extremities was suggested, she returned with joy. The removal of the first and second dorsal ganglia and the cervico-dorsal ganglia on both sides, two and one-half years after the first operation, has resulted in almost complete disappearance of the arthritis in both upper extremities. The hands are now warm and dry and there has been complete relief from pain in both hands with only the mildest kind of residual manifestations of arthritis in the wrists, right elbow and right shoulder. These results show that the nervous system is playing a rôle much greater in the phenomena of arthritis than has hitherto been supposed.

Dr. W. Roab of Vienna and Prague presented a very interesting paper on the "Hyperexcitability of Vasomotor Centers to CO_2 Tension as a Pathogenetic Factor in Essential Hypertension". According to Dr. Roab, slow deep breathing decreases the systolic blood pressure of patients suffering from essential hypertension with exception. Within fifteen minutes, there is a fall in pressure averaging twenty-eight millimeters with a maximum of sixty millimeters. In healthy persons this does not occur. The loss of CO_2 from the alveolar air and from the arterial blood has no influence upon the blood pressure of normal individuals whereas in hypertonic patients the CO_2 curve and the blood pressure curve both sink parallelly and after stopping the deep breathing both rise up quickly again. Deep breathing with a gas mixture prevents the decrease of carbon dioxide in alveolar air as well as the fall in blood pressure. Thus the decrease of blood pressure is not a mechanical effect but is due to the loss of carbon dioxide. Carbon dioxide inhalation in a closed gas apparatus increases the blood pressure of hypertonic persons. Thus the carbon dioxide tension of hypertonics is not higher than normal; the irritability of the respiratory center in hypertonics is not less than that of normal individuals. Thus an absolute increase of carbon dioxide does not occur but the pathological hyperirritability of the vasomotor centers is an important factor in the increase in blood pressure present in the hypertonic individuals. It is known that carbon dioxide acting upon the vasomotor centers causes vaso-constriction. Simple peripheral increase in blood pressure as produced by adrenalin injection is not at all affected by hyperventilation in normal individuals. On the other hand the peripheral vaso-constrictor effect of adrenalin and the hyperventilation effect in the central nervous system counteract each other. The adrenalin effect is marked. In contrast to the cases of essential hypertension, patients suffering from high blood pressure secondary to nephritis react to hyperventilation like normal individuals who have no hyperexcitable centers but who have peripheral increase in blood pressure. The nature of essential hypertension lies in a hyperex-

citability of the vasomotor centers especially to the carbon dioxide tension of the blood even in normal physiological tension, whereas in the case of patients suffering from nephritis with high blood pressure this factor is of no practical importance.

Findings on "Physiological Leucocytosis" were reported by Drs. W. E. Garrey and Virginia Butler of Nashville, Tennessee. They found that a recumbent posture for one hour and state of complete mental and physical relaxation, reduced the leucocyte count to a minimum. Any variation in the basal count is a certain index of disturbance of the basal state. In a given individual the basal count is constant from day to day. A basal count of seven thousand or over in normal subjects is evidence of mental or physical unrest or discomfort. The largest possible meal will not cause increase in the basal leucocyte count. Passive or active postural changes raise the count. This level is maintained with fluctuations, the extent of which are dependent upon the variations in muscular and mental activity. The increase in the leucocyte counts is proportional to the severity of muscular exercise—in a quarter mile race the count has been raised to thirty-five thousand per cubic millimeter. Mild grade physiological leucocytoses are due chiefly to an increase in the polymorphonuclear neutrophiles. Very high grade leucocytoses may show a preponderance of lymphocytes. In a basal individual nervous and psychic factors may induce a high grade leucocytosis. Acute cutaneous stimulation as by a dash of ether, raises the count from five thousand to eight thousand, or even ten thousand. Pain may raise the leucocyte count to twenty thousand in a subject resting in bed and be mistaken to indicate infection. A mental test raises the basal count to an activity level and the emotive states of apprehension, fear, rage, etc., also produce a marked leucocytosis. The changes are attributable to circulatory shifts with the liberation of leucocytes trapped in unused capillaries.

"Certain Nutritional Aspects of Tumor Growth: The Relation of Vitamin B" were reported by Dr. Wano Nakahara of Tokyo, Japan. According to previous investigators tumor tissue can grow actively in animals kept on vitamin B deficient diet inadequate to maintain the body weight. However this did not settle the important question of whether vitamin B is essential for tumor growth. Dr. Nakahara showed that the growing tumor did not utilize the vitamin B in the body of the host. His work consisted of a comparison of the amount of vitamin B reserve in the liver of tumor bearing and non-tumor bearing animals, both kept under the dietary condition in which extraneous supply of vitamin B is excluded. He found that the vitamin B stored in the liver is not depleted more rapidly in tumor bearing animals than in non-tumor bearing ones. In this work apparently the rapid growth of the tumors took place independently of the available vitamin B supply. He then considered the possibility of the tumor tissue being capable of synthetizing vitamin B. In his experiments, he indicated that evidence against vitamin B synthesis by tumor tissues seems to be shown though they do not exclude that possibility entirely.

Drs. L. G. Zerfas, H. A. Shorle, E. E. Swanson and G. H. A. Clowes of Indianapolis, Indiana reported investigation "On Surgical Anaesthesia with Sodium Isoamylethyl Barbiturate (Sodium Amytal)". They first studied the influence of purity of the product and pH range of the solution on depth and quality of anaesthesia. Sodium amytal like other barbituric acid derivatives, undergoes hydrolysis and ultimately decarboxylation when held in solution. A highly purified, stable anhydrous preparation of the sodium salt gives a maximum anaesthetic effect with a minimum degree of toxicity when injected slowly intravenously into dogs. When acid was added to this solution to the point at which the pH value is 9.2 to 9.3 a cloudiness appeared. Intravenous injection failed to give a satisfactory surgical anaesthesia and caused Cheyne-Stokes breathing and other toxic effects. It is therefore most important that sodium amytal used for intravenous injections in man should be highly purified and accurately adjusted as regards pH range. These investigators next studied the use of ephedrine and caffeine to counteract the effect of sodium amytal. Following sodium amytal anaesthesia there is frequently a somewhat prolonged period of post-anaesthetic sleep from which the dog may be aroused with difficulty. It appeared desirable before using this preparation in man to find out some means of counteracting the effect. This was accomplished in dogs by injecting a combination of ephedrine and caffeine intramuscularly. Dogs receiving such injections shortly after the operation when presented with food, began to eat and exhibited other signs of consciousness, whilst control dogs. which had not received the ephedrine-caffeine injections remained in a stuporous condition. The highly purified and accurately adjusted preparation has been used successfully for human anaesthesia in upwards of a thousand cases.

(To be continued)

AMERICAN ENDEMIC TYPHUS NOT LOUSE-BORNE?

A careful study of typhus fever in the United States by Maxcy of the United States Public Health Service indicates that there is endemic in the United States a disease which is clinically indistinguishable from the mild typhus occurring during interepidemic periods in the Old World and Mexico. The relationship of this disease to typhus is further borne out by serological similarities. The Felix-Weil reaction is positive.

According to Maxcy, the typhus which has been occurring in our Eastern seaports does not depend upon direct importation from across the sea. It belongs to the North American continent. In addition to the peculiarities of the virus, the disease in this country manifests certain epidemiological characteristics which are in contrast with those generally attributed to the typhus of the Old World. They relate principally to the mode of transmission. These considerations have led to a tentative rejection of the human louse as the principal vector and of man as the principal reservoir of the disease in this part of the United States, and to a search for some other mode of transmission. Since it is now known that besides the chimpanzee and the monkey, certain small rodents are susceptible to the virus, i. e., guinea-pigs, rabbits, rats (white and gray), mice (white) and the gerbille, the question arises whether

in the endemic typhus of the Eastern United States a reservoir of the disease may not exist other than in man, a rodent reservoir with accidental transmission to man through the bite of some parasitic, blood-sucking insect or arachnid. Obviously, the rodents upon which suspicion immediately falls are rats and mice, and the parasite intermediaries which are first suspected are fleas, mites or possibly ticks.

Our readers will realize from what has been said that the problems raised years ago by Brill when he called attention to cases of this disease in New York City are by no means solved. Physicians encountering cases of endemic typhus (Brill's disease) may find Maxcy's suggestion helpful in elucidating the epidemiology of this disease.—*Bulletin N. Y. City Department of Health.*

WEEKLY HEALTH INDEX

Telegraphic returns from 62 cities with a total population of twenty-nine million for the week ending September 7 indicate a mortality rate of 11.1 as against a rate of 10.2 for the corresponding week of last year. The highest rate (18.4) appears for Nashville, Tenn., and the lowest (4.9) for Canton, Ohio. The highest infant mortality rate (208) appears for Wilmington, Del., and the lowest for Erie, Pa., Kansas City, Kans., Lynn, Mass., Spokane, Wash., and Tacoma, Wash., which reported no infant mortality.

The annual rate for 61 cities is 13.4 for the thirty-six weeks of 1929, as against a rate of 13.1 for the corresponding weeks of 1928.

MAINE CLAIMS LOW TUBERCULOSIS DEATH RATE

Herbert M. Tucker, Chief of the Division of Animal Industry of Maine, claims that because of the low incidence of bovine tuberculosis in Maine that the death rate from human tuberculosis is lower in that state than is the case in any other state east of the Mississippi river.

GIFT TO A MAINE HOSPITAL

Cyrus H. K. Curtis of Philadelphia has donated $50,000 to the endowment of the Knox County General Hospital.

This brings the amount contributed by Mr. Curtis up to approximately $175,000 for this institution.

Here as in many other places summer residents have contributed generously to local hospitals and other institutions.

BOTULISM AND CANNED FOOD

Within the past ten months eleven outbreaks of botulism have been reported in the United States with 21 deaths.

The bacillus clostridium botulinum is especially prone to appear in home canned foods which have been prepared by the cold pack method.

The spores are only killed by prolonged exposure to heat hence the cold pack method is not ideal.

MORTALITY FROM AUTOMOBILE ACCIDENTS

Number of Deaths, August 14, 1927, to August 10, 1929, from Automobile Accidents

The Department of Commerce announces that during the four weeks ending August 10, 1929, 78 large cities in the United States reported 660 deaths from automobile accidents. This number (660) compares with 585 deaths during the four weeks ending August 11, 1928. Most of these deaths were the result of accidents which occurred within the corporate limits of the city, although some accidents occurred outside of the city limits.

For comparison, the number of deaths due to automobile accidents within city limits is desirable. Such figures are available for the four-week period ending August 10, 1929, and for the corresponding four-week period of 1928 for all of the 78 cities, the four-week figure in 1929 being 532 as contrasted with 465 for the corresponding four weeks in 1928.

Considering by four-week periods since May, 1925, total deaths from automobile accidents for 78 cities, regardless of place of accident, the lowest total (346) appears for the four-week period ending March 27, 1926, and the highest (771) for the four-week period ending December 29, 1928. The numbers in the 56 periods of four weeks were as follows:

Four weeks ending:

August 10, 1929	660	June 18, 1927	507
July 13, 1929	635	May 21, 1927	530
June 15, 1929	602	April 23, 1927	495
May 18, 1929	582	March 26, 1927	441
April 20, 1929	528	February 26, 1927	441
March 23, 1929	525	January 29, 1927	471
February 23, 1929	466	January 1, 1927	522
January 26, 1929	612	December 4, 1926	632
December 29, 1928	771	November 6, 1926	676
December 1, 1928	738	October 9, 1926	650
November 3, 1928	622	September 11, 1926	558
October 6, 1928	623	August 14, 1926	499
September 8, 1928	620	July 17, 1926	482
August 11, 1928	585	June 19, 1926	547
July 14, 1928	523	May 22, 1926	493
June 16, 1928	506	April 24, 1926	423
May 19, 1928	537	March 27, 1926	346
April 21, 1928	530	February 27, 1926	374
March 24, 1928	421	January 30, 1926	428
February 25, 1928	504	January 2, 1926	550
January 28, 1928	531	December 5, 1925	623
December 31, 1927	624	November 7, 1925	612
December 3, 1927	619	October 10, 1925	527
November 5, 1927	684	September 12, 1925	521
October 8, 1927	662	August 15, 1925	467
September 10, 1927	526	July 18, 1925	493
August 13, 1927	510	June 20, 1925	492
July 16, 1927	573	May 23, 1925	421

For the 52-week periods ending August 10, 1929, and August 11, 1928, the totals for the 78 cities were, respectively, 7,986 and 7,252, which indicate a recent rate of 24.3 per 100,000 population as against an earlier rate of 22.1 or an increase of 10 per cent. in the rate in a single year.

Five cities reported no deaths from automobile accidents for the last four weeks while six cities reported no deaths from automobile accidents for the corresponding period of 1928.

For the last four-week period reports as to whether deaths occurred from automobile accidents within

city limits or outside were received from all of the 78 cities reporting. In these cities in this four-week period, the total number of deaths from automobile accidents was 660, but only 532 of these were due to accidents within city limits.

DISTRIBUTION OF ENDEMIC GOITER IN THE UNITED STATES

Studies conducted by the United States Public Health Service during recent years indicate that the distribution of goiter in the United States as disclosed by numerous thyroid surveys, parallels, in general, the goiter findings which were recorded among the drafted men examined during the World War.

There are manifestly wide variations in the methods of determining thyroid enlargement. The classification of various degrees and types of involvement also ranges within wide limitations. Uniform procedure is a necessity if findings in different sections of the country are to be compared.

Based upon the occurrence of goiter, wholesale prophylaxis by means of the use of small doses of iodine either as iodized salt or otherwise for endemic goiter is apparently not required in all States.

Individual thyroid surveys disclose foci of endemic goiter in localities not previously regarded as being located in goitrous territory.

Resurveys are desirable for the purpose of learning the extent and character of changes occurring either under natural conditions or after prophylaxis has been instituted.

NEWS ITEMS

THE APPOINTMENT OF DR. MARIO GARCIA BANUS

Dr. Mario Garcia Banus has been appointed Assistant Professor of Physiology at Tufts Medical School.

Dr. Banus is a graduate of the Institute de Sn. Isidro, and obtained his Master's and Doctor of Science degrees at the University of Madrid.

He has done research work at the Universities of Kiel and Heidelberg, at Yale, and Rockefeller Institute.

For the past four years he has been connected with the Physiology Department at Western Reserve Medical School.

Dr. Banus has made numerous contributions to the literature of physiology.

NEW ENGLAND PHYSICIANS IN THE PROGRAM OF THE NEW YORK ACADEMY OF MEDICINE—November 22: The Relation of Orthopedics to Pediatrics. By Dr. Frank R. Ober, Instructor in Orthopedic Surgery, Harvard University.

December 13—Acidosis and the Water Exchange. By Dr. John P. Peters, Professor of Medicine, Yale University.

February 21—Psychiatry's Part in Preventive Medicine. By Dr. Arthur H. Ruggles, Chief Neuro-Psychiatrist, Butler Hospital, Providence.

FUTURE FUNDS FOR THE LYNN HOSPITAL—By the will of Mary M. Oliver of Saugus, a trust is created of twenty-five thousand dollars, with the provision that certain heirs have a life interest in the income. The principal will be given to the Lynn Hospital on the termination of the life interest. In addition the residue of the estate is similarly left to the Lynn Hospital at the termination of another life interest.

NOTICE OF MEETING

NEW ENGLAND SURGICAL SOCIETY

The annual meeting will be held at Providence, Rhode Island, and Fall River, Massachusetts, Friday, September 27, and Saturday, September 28.

Headquarters: Providence Biltmore Hotel.

GENERAL PROGRAM

FRIDAY, SEPTEMBER 27, 1929
FALL RIVER, MASS.

A. M.
8:30 Operative Clinic
The Truesdale Hospital
10:30 Dry Clinic
The Truesdale Hospital
12:30 Luncheon at Westport Harbor
P. M.
1:30 Symposium—Kidney Stone
The Diagnosis of Renal Stone
Dr. Arthur L. Chute
The Treatment of Renal Stone
Dr. Richard O'Neil
The Result of Renal Stone
Dr. J. D. Barney
4:30 The President's Annual Address
"The Talking Motion Picture as a New Agency for the Dissemination of Medical Knowledge."
5:00 Leave Westport Harbor
7:00 Annual Dinner at the Squantum Club

SATURDAY, SEPTEMBER 28, 1929
PROVIDENCE, R. I.

A. M.
8:30 Clinics
Memorial Hospital, Pawtucket, R. I.
10:00 Clinics
Rhode Island Hospital
12:30 Luncheon
Rhode Island Hospital
P. M.
1:30 Business Meeting
Rhode Island Hospital
2:00 Scientific Program
Rhode Island Hospital

SCIENTIFIC PROGRAM

I. "Some Problems in the Dispensary Teaching of Surgery."
Dr. W. E. Hartshorn, New Haven, Conn.
II. "Gastroenterostomy with a Transverse Jejunal Incision." A Clinical and Experimental Study.
Dr. T. S. Moise, New Haven, Conn.

III. "What Can the Members of the New England Surgical Society Do to Improve the Treatment of Fractures?"
Dr. C. L. Scudder, Boston, Mass.

IV. "Chronic Cholecystitis and the Graham Test."
Dr. E. L. Young, Jr., Boston, Mass.
and Dr. Horace Sowles, Boston, Mass.
By Invitation

V. "Compressed Air Rupture of the Intestines."
Dr. D. C. Patterson, Bridgeport, Conn.

VI. "The Comparative Study of Body Fluids in Cancerous and Non-Cancerous Individuals."
Dr. H. C. Pitts, Providence, R. I.

CASE REPORTS

VII. "Melanotic Sarcoma of the Small Intestine."
Dr. F. B. Lund, Boston, Mass.

VIII. "Duodenal Fistula."
Dr. T. W. Worthen, Hartford, Conn.

SOCIETY MEETINGS, CONGRESSES AND CONFERENCES

September 27-28—New England Surgical Society. Detailed notice appears elsewhere on this page.

October 7-19—New York Academy of Medicine. Detailed notice appears on page 468, issue of February 28.

October 13-18—General meeting of the International Society of Medical Hydrology and International League for Combating Rheumatism. Detailed notice appears on page 288, issue of August 8.

October 21, 22, 23, 24, 25—International Assembly of the Inter-State Post-Graduate Medical Association of North America. For detailed notice see page 341, issue of August 15.

November 4, 5, 6 and 7, 1929—Clinical Congress and Eighth Annual Meeting of the American College of Physical Therapy. See page 149, issue of July 18, for details.

December 2-6—The Radiological Society of North America. Complete notice appears on page 149, issue of July 18

May 5-10, 1930—First International Congress on Mental Hygiene. See page 191, issue of July 25, for details.

DISTRICT MEDICAL SOCIETIES

Bristol North District Medical Society

The Fall Meeting will be held at the Tavern, Mansfield, on Thursday, September 19, at 1 P. M.

J. L. MURPHY, Secretary.

Franklin District Medical Society

The meetings of the Franklin District Medical Society will be held at the Weldon Hotel, Greenfield, Mass., on the second Tuesdays of November, January, March and May, at 11 A. M.

CHARLES MOLINE, Secretary.

Hampden District Medical Society

The next meeting will be held October 22 at the Springfield Academy of Medicine.
The program will be arranged by Dr. L. E. Phaneuf and the Section of Obstetrics and Gynecology.
Details will appear later.

HERVEY L. SMITH, Secretary.

Middlesex East District Medical Society

October—Joint meeting with Middlesex North and Essex North and South.
November 13—At Reading.
January 15—At Boston, Harvard Club.
March 12—At Melrose.
May 13—At Unicorn Country Club.

ALLAN R. CUNNINGHAM, Secretary.

Middlesex South District Medical Society

October 17—Newton Hospital. Surgical, medical and pathological demonstrations. Speaker and complete program to be announced later.
November 6—Censors' meeting.
April 16, 1930—Annual meeting. Commander Hotel, Cambridge. Program to be announced.
Winter meetings—jointly with Suffolk District.
May, 1930—Censors' meeting.

ALEXANDER A. LEVI, Secretary.

Norfolk District Medical Society

Schedule of meetings for the year 1929-1930. Invitations have been sent to the speakers and the list is true only on condition of their acceptance.

October 29—Medfield State Hospital, Harding, Massachusetts. Papers by the Staff.

November 25—Roxbury Masonic Temple. Dr. Roger Graves, "Urology from the Standpoint of the General Practitioner." Surgical discussion. Medical discussion.

January 27, 1930—Roxbury Masonic Temple. "Recent Advances in Diagnosis and Treatment of Syphilis." Speaker to be announced.

February 24, 1930—Roxbury Masonic Temple, 8:00. Dr. Edwin H. Place has been invited to read a paper and has been given carte blanche in the selection of his subject.

March 24, 1930—Roxbury Masonic Temple. Dr. Burton E. Hamilton. Subject to be announced.

May 6, 1930—Annual Meeting. Program to be announced.

The Censors meet for the examination of candidates, November 7, 1929, and May 1, 1930, in the Roxbury Masonic Temple, 171 Warren Street, Roxbury, at 4:00 P. M. Applications must be in the hands of the Secretary at least one week previous to date of examination.

Owing to inability to engage the Roxbury Masonic Apartments on the last Tuesday of the month, such meetings as will be held in the Roxbury Temple will be held Monday evenings as per the dates above.

FRANK S. CRUICKSHANK,
Secretary, Norfolk District Medical Society.

Plymouth District Medical Society

October 29—Massasoit Hall, 6 Main Street, Brockton, at 8 P. M. Speaker, Dr. Chevalier Jackson of Philadelphia. Subject: "Bronchoscopy as an Aid to the Internist and Surgeon in the Diagnosis and Treatment of Diseases of the Lung." Lantern slides and moving picture demonstration.

THOMAS H. McCARTHY, President.

BOOK REVIEWS

Modern Methods of Feeding in Infancy and Childhood. By DONALD PATERSON, B.A., M.D. (Edin.), M.R.C.P. (Lond.), and J. FOREST SMITH, M.R.C.P. (Lond.). Second Edition. Published by Paul B. Hoeber, Inc. New York, 1929. Price $3.00.

This book, while up to date and practical, varies very little from many other excellent books on the same subject. By English authors, its viewpoint is British, which is in no essential different from our own. The use of prepared milk foods is enlarged upon more than we are accustomed to do and many specific brands are described.

It delights the reviewer to find that the prevalent universal overfeeding with carbohydrates is decried.

There are many tables of diets and chapters on feeding during the various types of digestive disturbances. The book devotes itself entirely to the matter of feeding, omitting other factors in the care of the child.

It should be of some value to the general practitioner who wishes to take care of infants' and children's feeding without making a specialty of it.

Ker's Infectious Diseases. A Practical Text Book. Revised by CLAUDE RUNDLE, M.D. Third Edition. Humphrey Milford. Oxford University Press, 1929. Price $10.50.

This authoritative and valuable work on infectious diseases now appears in its third edition and, owing to the death of its author, has been revised and brought to date by Claude Rundle, the Medical Superintendent of the City Hospital and Sanitarium

at Liverpool. The great value of this book lies in the fact that it not only gives unusually complete discussions of the etiology of the various diseases, but it gives extensive first-hand and most intelligent observations on the symptoms caused by these various diseases. The errors are so few as to be notable. Perhaps one of the most conspicuous is the omission of any discussion of the immune reactions following vaccination with smallpox vaccine virus. In this chapter, one might criticise the method of vaccination as advocated by the author, since in this country the multiple pressure method of vaccination has been found more satisfactory.

There are other slight errors such as the description of the antitoxic unit, but these in no way seriously detract from the value of this book.

As a textbook or book of reference for the medical student, the practitioner or the public health worker, it has few equals and should find a place in the library of all those interested in communicable diseases.

It is a well made book with pleasing print, with original half-tones and with one notable colored plate depicting the rash in scarlet fever.

The Nurse in Public Health. By MARY BEARD, R.N. Harper and Brothers, 1929. Price $3.50.

A standard book on Public Health Nursing has already been written by Miss Mary S. Gardner, and to supplement and enlarge upon her material at certain points, and present some current problems of public health nursing administration is, Miss Beard says, her aim in writing the present volume. And who is better qualified to do so than one who for twenty-five years has had experience in this work, first as a visiting nurse, then director of a visiting nurse association, and later president of the National Organization for Public Health Nursing.

During the past ten years or more, rapid progress has been made in preventive medicine, therefore public health nursing, a branch of it, has been influenced, and we are first informed of the changes in its administration, technic, and ideals.

Public health nursing in rural communities is next brought to our attention, and because the demand is so great and the handicaps so numerous, an entire chapter is devoted to this subject with an insight as to how these difficulties are overcome, in part by the splendid work and co-öperation of private agencies.

In the cities of Toronto and Boston public health nursing is so well conducted that there is much to be gained in reading the chapter on some aspects of the work in these two cities.

As the author has been a student of conditions in public health nursing in Great Britain and on the continent, as well as throughout the United States, and believes that we are far behind in the care of mothers in childbirth, she writes at some length on maternal care as practised in England and Denmark, to which countries we must look for helpful suggestions.

New public health nursing methods as contrasted with former methods of nursing in some of the old European countries naturally afford interesting material written in a most pleasing descriptive style.

There is much to be accomplished in arriving at satisfactory methods for the education of public health nurses, but we are assured that the outlook is promising. The character of the public health nurse is also discussed, and it is encouraging to learn that more of a human element enters into the work, and the nurse of today realizes that "to be successful she must come close to the families under her care in many ways besides the physical contact of the bedside care."

With a terse summarization of the book the author uses her imagination in a chapter entitled "The Future," which, if realized, would bring about ideal public health nursing.

The book is essentially written for administrators and instructors of public health nursing organizations, for lay boards of these associations, for trustees of hospitals, and others responsible for nursing schools, and for state and county health officers.

Clinical Laboratory Methods. By RUSSELL LANDRAM HADEN, M.A., M.D. With sixty-nine illustrations and four colored plates. Third Edition. St. Louis. The C. V. Mosby Company, 1929. Price $5.00.

The author has written this book for the purpose of providing a simple yet complete outline of the usual laboratory methods for the average clinical laboratory worker. The volume that he has produced gives in orderly form accurately detailed descriptions of laboratory procedures, reagents and technical methods. This book has the further advantage of containing only methods which have been thoroughly tried by the author and found to be dependable.

There are a few errors which should be corrected in the next revision. For example, on page 39 the author in describing the apparatus used in Benedict's method for the quantitative estimation of sugar in the urine describes the use of a porcelain evaporating dish, whereas his illustration shows a flask. Then on page 61, there is a cut of a porcelain mixing plate for use in blood grouping, which should be on page 213. On page 223, the temperature for dry glassware sterilization might better be 160° instead of 150°. On page 224, and on several other pages where sterilization by steam under pressure is described, the author makes the very common mistake of interpreting various pounds of pressure as corresponding to varying degrees centigrade. It would be better if actual sterilization temperatures instead of pressures were indicated.

The one weak feature of this book is the incompleteness of the descriptions of bacteriological methods. Neither reliable isolations nor diagnoses could be made by following the very sketchy descriptions given. This is particularly notable in the case of the discussion of methods for culturing cerebrospinal fluids as given on page 245.

The book is conveniently arranged, well printed and the cuts and illustrations are adequate. It should prove to be a useful book for the clinical laboratory worker.

The Facts of Modern Medicine. By FRANCIS W. PALFREY, M.D. Pub.—D. Appleton and Company, New York. Price $5.00.

This volume is a fairly large one and is divided into various sections; the first, "Preliminary Considerations", containing three chapters; the second, "The Fundamental Sciences", seventeen chapters;

and the third, in which the author takes up "Diseases", twenty chapters. There are nearly 500 pages and 30 illustrations.

Dr. Palfrey states in his Introduction that the purpose of his book is to promote among the laity a better understanding of medicine. He believes that the laity is woefully ignorant of the elementary facts of physiology, pathology and disease in general. He classifies popular books which have already been written upon medicine and medical subjects as follows:

1. Those books pertaining to be "family medical advisers", most of which he considers to be dangerous,
2. Volumes promoting some new fad which the medical profession as a whole does not endorse,
3. Fraudulent medical literature which is harmful to a great degree,
4. Books on "first-aid" medicine and surgery. He believes that these are good as far as they go but are too superficial to be of value,
5. Other books of popular information on medicine, a few of which he believes to be eminently sound.

In his Preface he states that the "gap between the knowledge of the general public and that of the medical profession is constantly increasing". I would be inclined to doubt this statement very strongly as I am sure that in many ways the public or parts of the public at least, particularly school-children, know a great deal more about certain major diseases (tuberculosis, for instance) and their prevention and the campaign in general against them than do many practitioners of medicine. Dr. Palfrey intends this book for the general public. It is also intended for the beginning medical student "to approach more understandingly the actual work of the medical school". In that part of the book devoted to "Preliminary Considerations" he takes up briefly the layman's point of view of medicine and then makes a preliminary survey of the field of medical study. I note with regret that he uses the expression "in the author's opinion" instead of what I believe to be the more forceful personal pronoun "I". Part I, "The Fundamental Sciences", is divided into chapters considering anatomy and physiology, the internal organs and their vital functions, the heart and circulatory system, the lungs, the digestive system, metabolism and internal secretions, kidneys and urinary system and the nervous system. He takes up the phenomena of reproduction, devotes a great deal of space to pathology and pathological physiology and then discusses infection by various bacteria and methods on which modern diagnosis is based, therapeutics and finally, public health and other preventive methods of medicine.

In Part II, "Diseases", Dr. Palfrey considers disorders due to poisons, diseases of the heart, the blood, lungs, digestive system, etc. In fact, with very few exceptions, he considers briefly all the ills to which man is heir. In the addendum he devotes a chapter to "Death, Considered Objectively" which is one of the most interesting in the book.

This book must be judged from two points of view, one, its value to the general public, and, second, its value to the medical students, social workers, nurses and others semi-medically trained. To the latter group which, of course, is a limited one, I can recommend this book very highly. Naturally, in considering such an enormously large subject and so many different diseases and diseased conditions the space allotted to each must be limited. Dr. Palfrey has done his job well. He does not devote enough attention to tuberculosis and the campaign against it and to certain other broader aspects of preventive medicine but what he says is undoubtedly sound. His comments on venereal diseases are excellent and might well be broadcast among the youth of this country, particularly at such a period as the present when a relaxing of moral fibre and the doing away of old and time-honored inhibitions are fairly evident.

When it comes to consider the value of a volume such as this, costing $5, weighing approximately five pounds, containing 500 pages, replete with microphotographs of cross sections of corneal ulcers, liver cells, etc., to the average laity, I admit that I am somewhat aghast. I doubt very much if the average lay man or woman would be tempted to purchase this book, or, having done so, would be able to follow the detailed scientific descriptions of diseases, the details of which have heretofore been quite properly left to the physician. Frankly, I have found this book distinctly hard reading and it has left me with a sense of being overwhelmed at the vastness of the medical information which Dr. Palfrey has placed between two covers.

It is a book which I believe medical students and, indeed, physicians of all ages might well read parts of at least with profit but I really doubt very much the ability of the average man or woman not medically trained to grasp the essential points out of this immense mass of medical and even technical facts and information.

The Science of Psychology. By RAYMOND HOLDEN WHEELER. Pp. XVII+556: 68 illustrations. Thomas Y. Crowell Co., New York, 1929. **Price $3.75.**

This text-book with its added bibliographies is so comprehensive that it makes collateral reading unnecessary for the student, and the divisions of the subject matter of the chapters make the volume an easy one for reference. The text is based on laboratory investigation and is written from the standpoint of the newer *Gestalt* theories, that is, it emphasizes the performances of the intact total organism, as an organic whole. The volume in turn discusses social, emotive, intelligence, learning and observational behavior and embodies many of the most recent investigations in theoretical and experimental psychology.

The author feels that progress in psychological text-book writing has not kept pace with psychological research. Consequently he has made the volume as comprehensive as possible, stating and interpreting many opposing theories and embodying independent developments in physics, neurology, physiology and sociology, so far as these are related to psychological principles. The volume begins with the whole of which a human being is psychologically a part, namely, the social group, and this is explained in terms of configurational principles. As a result of this method of elaboration, only the latter chapters are devoted to sensation and the nervous system, instead of the introductory chapters, as in so many text-books on psychology.

For the author, psychology is a study of conscious behavior alone, consequently the large part played by unconscious thinking in human behavior and reactions, whether normal or pathological, receives

a minimum of attention. It is difficult to understand this attitude, because if psychology is a biological science from the standpoint of the individual, there must be mental processes of which the individual is not aware or only dimly so. There are also certain other additional features which do not receive the space they deserve, such as the early family constellations, the newer theories of hypnosis and the psychological nature of suggestion, apart from a mere definition. To call psychoanalysis "But another attempt of suggestive therapeutics" and to state that the purpose of psychoanalysis is to uncover forgotten causes and permit the subject to express his hidden emotions, without any mention of the part played by internal resistances, is a frequent error of the academic and experimental psychologist. Not one of Freud's epoch-making contributions is given in the bibliography to this section. It seems strange, too, that in a text-book devoted to a configurational psychology, no mention is made of the work on apraxia by Liepmann and his co-workers, which has added so much to an understanding of the perception of form. In the section on aphasia, there is no reference to Head's recent and, in many ways, revolutionary work on the subject. With these exceptions, which we hope will be corrected by the author in a subsequent edition, the volume is one of the best general psychological texts which has come to our notice.

La Coxite Gonococcique. By MARTHE-LAMY. Gauthier-Villars et Cie, Editeurs, Paris, 1929. Price 35 fr.

The author has made a study of gonorrhoeal arthritis of the hip using as a basis 180 reported cases and 11 personally observed cases. He has gathered together all the published material relating to his subject and has collected an extensive bibliography. From this material he has completed a treatise presenting in detail the appearance and evolution of the morbid process in all its aspects. It appears from this study that gonorrhoeal arthritis of the hip is an unusually severe manifestation of this infection, that it may endanger life, that it almost always results in crippling either due to ankylosis or spontaneous dislocation of the joint, and that the true diagnosis is often overlooked. In infants the process has frequently been considered a pyogenic infection, in women at the puerperium a metastatic arthritis from puerperal infection, and in active adults a manifestation of chronic arthritis or tuberculosis.

The work is chiefly of reference value. It is unfortunate that the book is so long because valuable lessons might be learned from this study if with discrimination the material had been compressed into an article of reasonable length. Even from the standpoint of the specialist it is doubtful if gonorrhoeal arthritis of the hip is a sufficiently important subject to justify a treatise of this extent.

Researches in Polynesia and Melanesia. An Account of Investigations in Samoa, Tonga, the Ellice Group, and the New Hebrides, in 1924, 1925. Parts V-VII. By PATRICK A. BUXTON, M.R.C.S., D.T.M. & H. Published by the London School of Hygiene and Tropical Medicine, London, W. C. 1, November, 1928.

In the latter part of 1927 the first volume of these researches was submitted for review. This second installment maintains the same high standard of excellence.

In the Foreword the author says that: "It has become more and more clear that the pathology of filariasis is one of the most complex and least understood of the problems of tropical medicine . . . that progress will come from the accumulation of masses of facts, which must be established on the most secure basis."

Part V of the work presents such data. Among other points of interest it clearly demonstrates a marked parallelism between enlargement of the epitrochlear glands and the finding of microfilariae in the blood. The author believes, therefore, that this sign may be used as an index of filarial infection in the region studied but he points out that the adenitis of secondary yaws is a disturbing factor in childhood and that the presence of other causes for adenitis may render the index worthless in other parts of the world.

Part VI contains observations upon a variety of diseases. Part VII compares the old life of the native with the new and discusses the influence of European civilization. There are seven Appendices, most of which deal with filariasis.

Two of the illustrations which show epitheliomata in natives of the Islands are of special interest.

BOOKS RECEIVED FOR REVIEW

Artificial Sunlight and Its Therapeutic Uses by Francis Howard Humphris. Fifth Edition. Published by Oxford University Press. 337 Pages. Price $3.25.

Ker's Infectious Diseases. Revised by Claude Rundle. Third Edition. Published by Oxford University Press. 614 Pages. Price $10.50.

The Principles of Electrotherapy and Their Practical Application by W. J. Turrell. Second Edition. Published by Oxford University Press. 413 Pages. Price $4.75.

Endocrine Disorders by Professor Hans Curschmann. Published by Oxford University Press. 188 Pages. Price $4.00.

Practical Handbook for Diabetic Patients by Abraham Rudy. Published by M. Barrows & Company. 180 Pages. Price $2.00.

The Science of Psychology by Raymond Holder Wheeler. Published by Thomas Y. Crowell Company. 556 Pages. Price $3.75.

Die Encephalitis lethargica ihre Nachkrankheiten und ihre Behandlung by Prof. Dr. C. v. Economo. Published by Urban & Schwarzenberg. 251 Pages.

State Board Questions and Answers by R. Max Goepp, M.D. Published by W. B. Saunders Company. Sixth Edition. 754 Pages. Price $6.00.

Outline of Preventive Medicine. Published by Paul B. Hoeber, Inc. 398 Pages. Price $5.00.

Varicose Veins (With Special Reference to the Injection Treatment) by H. O. McPheeters, M.D. Published by F. A. Davis Company. 208 Pages. Price $3.50.

Surgical and Medical Gynecologic Technic by Thomas H. Cherry, M.D. Published by F. A. Davis Company. 678 Pages. Price $8.00.

The Principles of Clinical Pathology in Practice by Geoffrey Bourne and Kenneth Stone. Published by Oxford University Press. 392 Pages. Price $4.75.

An Introduction to Pharmacology and Therapeutics by J. A. Gunn. Published by Oxford University Press. 220 Pages. Price $1.50.